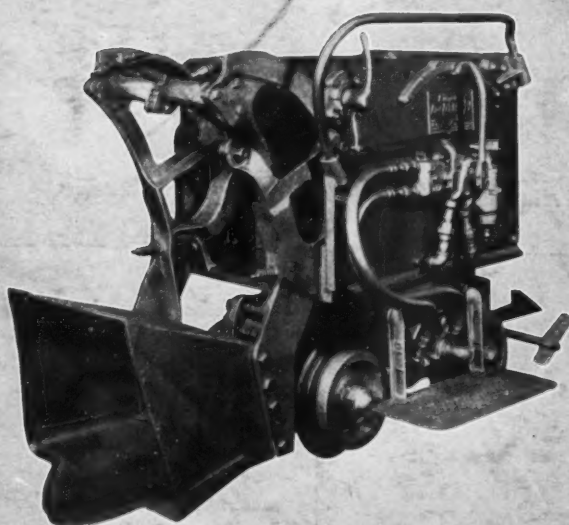


# MINING WORLD



*in this issue*  
**Russian Minerals—  
Strength or Weakness???**

*Page 34*



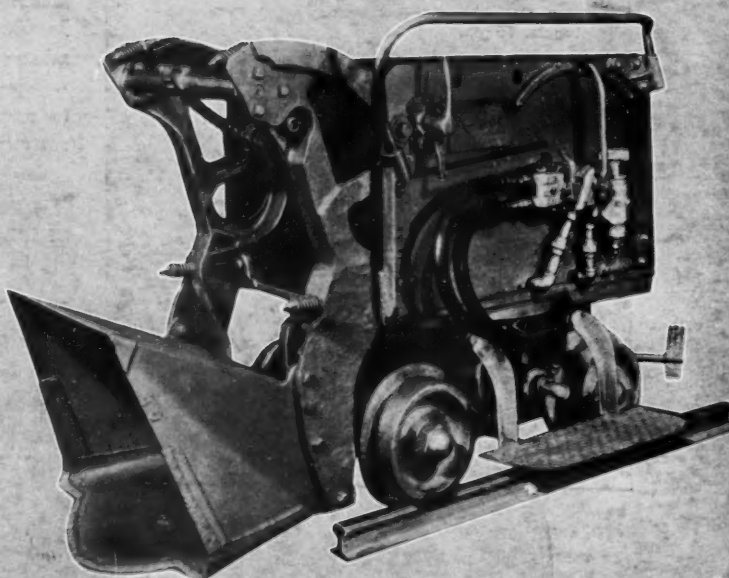
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**SEPTEMBER, 1951**

Vol. 13 No. 10

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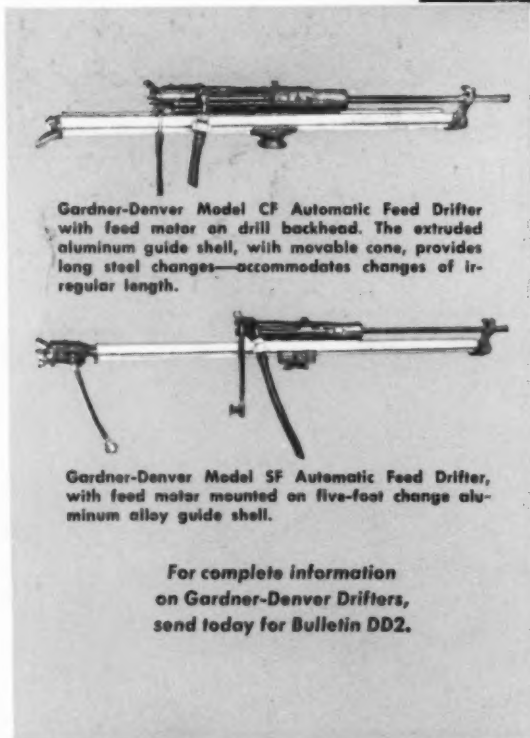
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from your mine?

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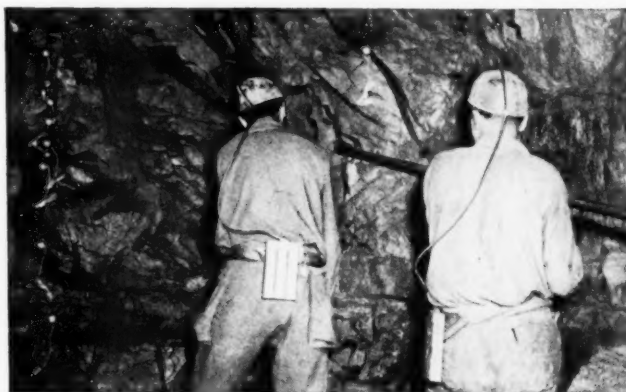
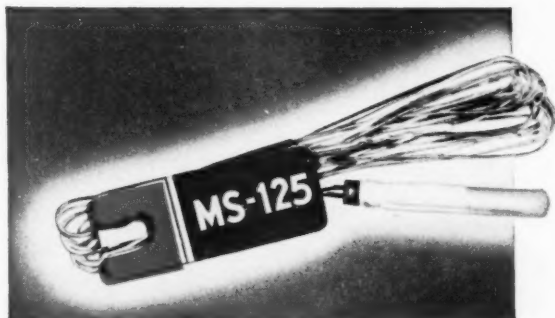
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*Available in 14 millisecond intervals of delay: MS-25, -50, -75, -100, -125, -150, -175, -200, -250, -300, -350, -400, -450 and -500.*



**Easy to handle**, easy to work with, "MS" Delay Caps have grown in popularity because they are as safe as they are efficient. These caps can be readily hooked up without error because every delay period is clearly marked for positive identification.



**Excellent fragmentation** consistently obtained with "MS" Delay Caps helps keep operations right on schedule . . . boosts production . . . lowers cost. These caps substantially reduce concussion and vibration.

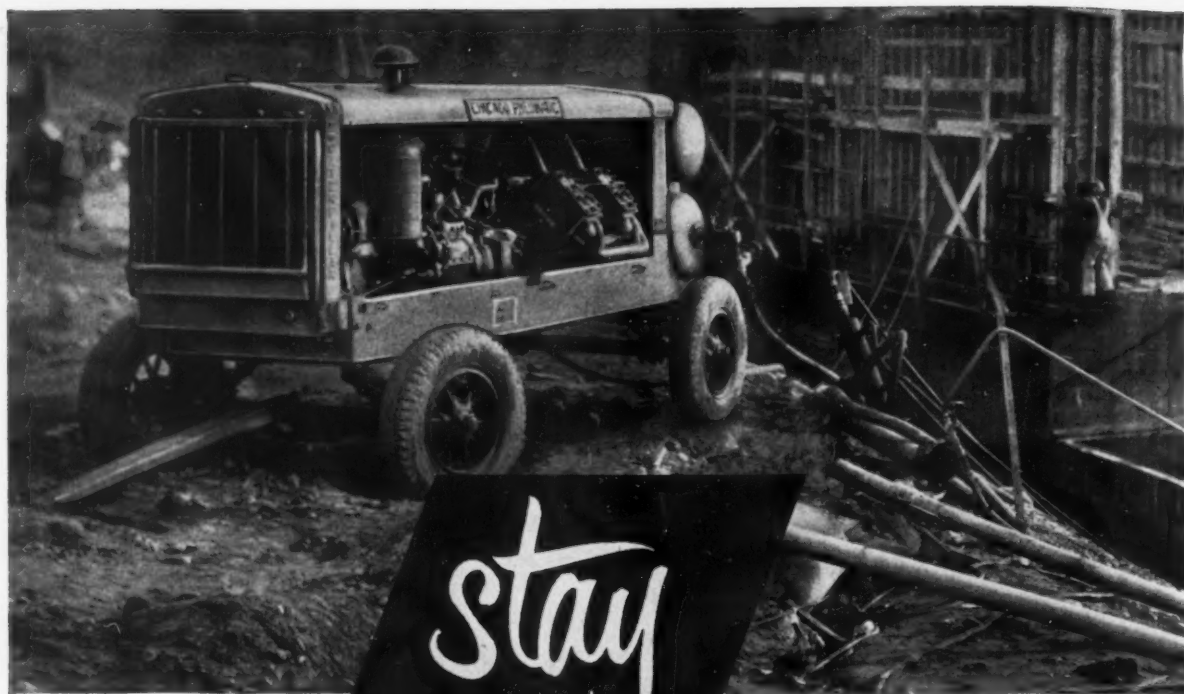
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MINING WORLD, September, 1951, Vol. 13, No. 10.  
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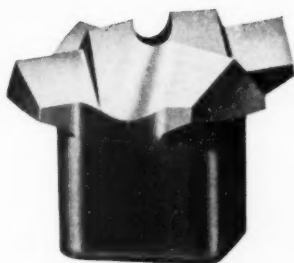
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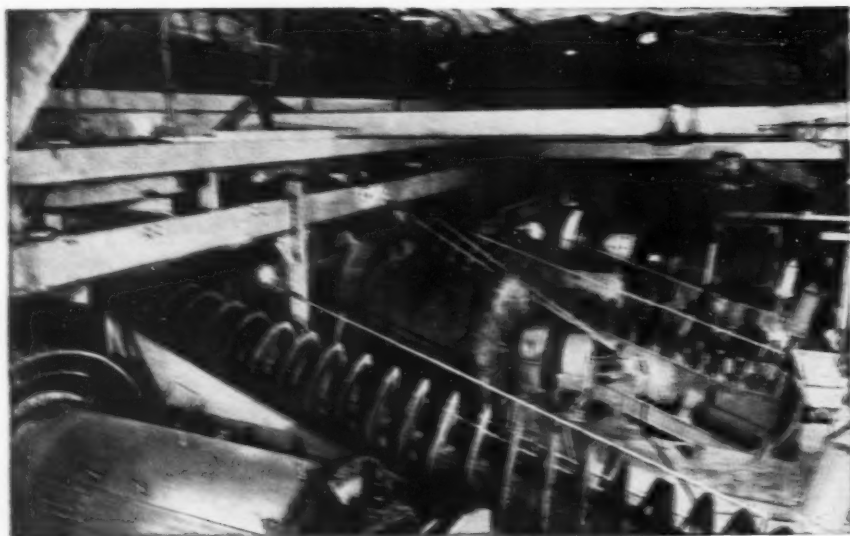
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**your best bet for the best bit  
... for every job**

SEPTEMBER, 1951

# Underground lead-zinc mill hits 1200 tons per day!

**1** Hauling cars of lead-zinc ore up 15° slope to the underground mill is this 72" drum hoist, driven by G-E 300-hp 440-volt motor and control. Only one of its kind, the Gilman lead and zinc mill was built entirely underground because in the mountainous terrain surrounding it there is not enough level country. Several hundred feet down, in rooms cut out of hard rock, crude ores from the adjacent mine are concentrated for smelting at distant plants.



**2** In the underground grinding room, two 100-hp and two 75-hp 440-volt G-E motors and control drive grinding mills. Classifier drives consist of four 10-hp G-E motors and control. Naturally heated to 82°F, water for grinding process is pumped from mine to mill by G-E induction motors.

GENERAL  ELECTRIC

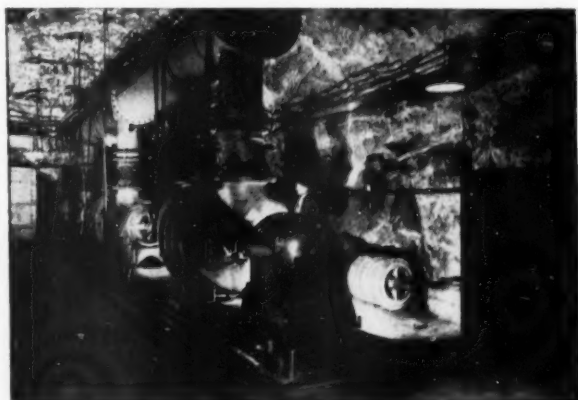
440-22

MINING WORLD

**Co-ordinated G-E drives and distribution equipment help maintain continuity of production at New Jersey Zinc's unique Gilman, Colo. concentrating plant**



**3** Grouped motor control is provided at several points throughout the mill by compact G-E Cabinetrol\* units. Space-saving Cabinetrol "packages" include all controls and instruments needed for various milling processes. This neat assembly, together with its associated push-button stations, is located in the mill's flotation cell room.



**4** After grinding the ore, lead minerals are separated from zinc minerals and waste, and then zinc minerals are separated from waste tailings in flotation cells. Air for flotation cells is supplied by these blowers, driven by three 125-hp 440-volt G-E a-c motors, with G-E control at right.

\*Reg. trade mark of General Electric Co. for enclosed control panel equipment.



**5** Power for the mine comes down from the surface at 13,800 volts through 4500 feet of G-E armored cable. At this substation—comprising a G-E switchboard and three 150-kva Pyranol† transformers with gas absorbers—it is stepped down to 440 volts for utilization throughout the mine's two lowest levels.



**6** To protect equipment against damage from excessive overcurrents caused by heavy overloads or short circuits, the mill uses four G-E 3-pole air circuit breakers rated 600 amperes, 600 volts. G-E air-circuit breakers, selected for adequate interrupting capacity, help safeguard against loss of production in all milling operations.



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EQUIPMENT  
for the Mining Industry**

At every stage in ore processing—mining, concentrating, smelting, or refining—a G-E mining industry specialist can help you solve your electrical problems efficiently, economically. He's a good man to know. Call him soon! General Electric Company, Schenectady 5, N. Y.

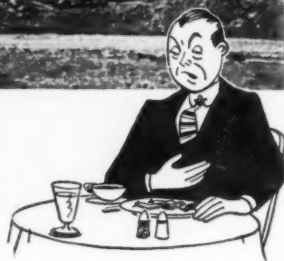
†Registered trade mark of General Electric Co. for askarel.



**"One man's meat is another man's poison..."**



*"I'm blasting a ditch. I want to throw that muck UP and OUT. The farther it flies the better. This is a good blast for me, because it's doing what I want—it's making ditch."*



*"I'm blasting for rock. I don't want to throw it up in the air. I want it broken and dropped for my shovels. Here much of the power of the explosives is going to waste. A mighty poor blast for me!"*

The blast that is just right for one operator may be all wrong for another. A ditching shot like the one at left above is meat for the farmer or agricultural engineer. But such throw is strictly poison for blasting work in quarries, strippings and most construction jobs.

The ROCKMASTER Blasting System gives better control over explosives force—enabling you to strike the proper balance between throw and breakage—to suit *your* job.

Your Atlas representative will be glad to help you use the proper combination of the 16 available ROCKMASTER split-second delay detonators, plus explosives and loading methods especially suited to your requirements.

Write today for the ROCKMASTER "16" booklet, showing typical loading diagrams for several types of quarrying, stripping and construction blasting operations. It's yours for the asking.

Less Bark  More Bite

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0 (zero)	0 (inst.)
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2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

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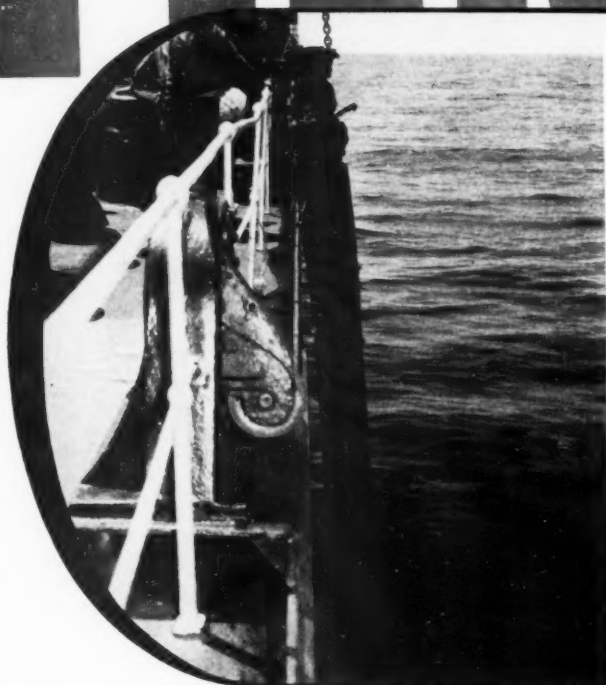
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It's easy—just call your scrap dealer. Check the Yellow Pages of your telephone directory.

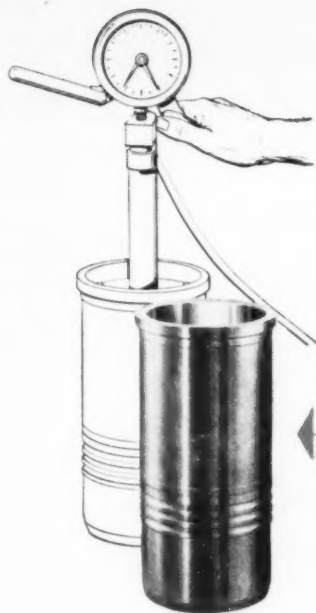


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twice  
the care*

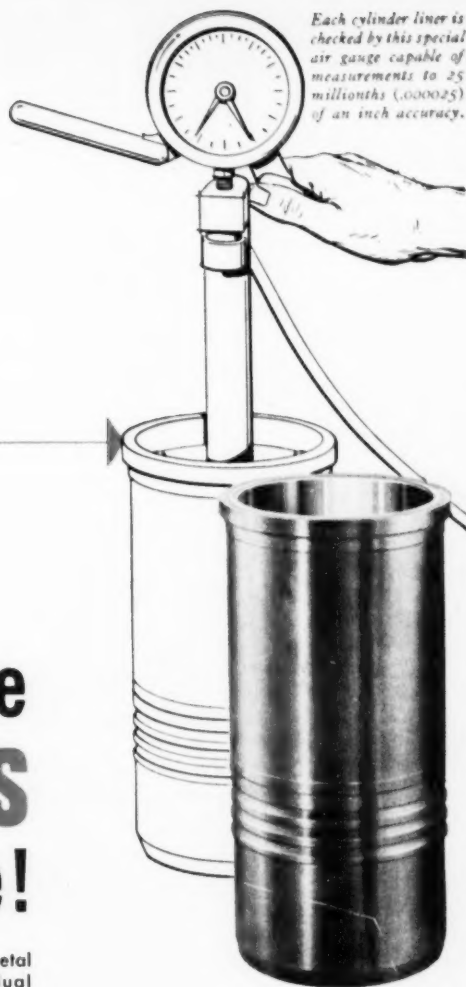
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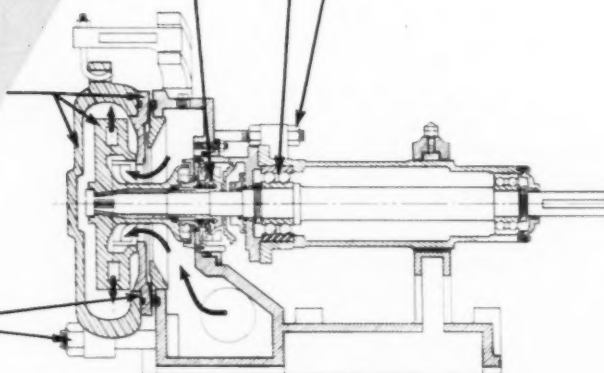
**Centrifugal sealing** eliminates leakage, friction and sealing water dilution.

4

**Extremely hard alloys** minimize wear in the case, runner, follower plate and die ring.

5

**Quick disassembly features** cut time required for replacement of wearing parts to as little as 15 minutes.



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and the export edition  
WORLD MINING

**A Miller Freeman Publication**

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## SEPTEMBER, 1951

VOL. 13 No. 10

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## DRIFTS AND CROSSCUTS

### The Supply and Demand for Gold

Since higher base metal prices exist outside the United States than inside, shipments normally destined for the United States have been diverted to Europe and other areas. The demand has increased and the price is higher . . . fundamental economics.

A similar situation is true of gold, and comparison of the United States gold imports and exports for 1949 and 1950 clearly proves this fact. Gold is more valuable, for hoarding perhaps, on the world market than when held by the Treasury Department. The United States has shifted from a buyer to a seller. There are several factors accelerating this change. Marshall Plan aid from the United States to other countries to help stabilize their economies and to hold a favorable balance of trade is one factor. The need of the United States for commodities from other countries has increased the outward flow of gold. Many countries have been converting dollar balances into gold.

### UNITED STATES IMPORTS OF GOLD IN ORE AND BASE BULLION AND REFINED BULLION IN 1949 AND 1950 BY COUNTRIES OF ORIGIN.\*

Country	Ore and Base Bullion		Refined Bullion	
	1949	1950	1949	1950
Canada .....	166,567	183,199	812	270,933
Mexico .....	119,935	103,626	922	.....
Ecuador .....	81,165	96,376	.....	.....
Philippine Isls. ....	75,495	85,996	.....	.....
Peru .....	9,036	19,367	.....	.....
Australia .....	7,675	18,299	.....	.....
Chile .....	66,649	40,415	.....	.....
Honduras .....	16,458	20,532	.....	.....
Japan .....	.....	2,536	.....	1,272,294
W. Pacific Isls. ....	133,111	92,171	.....	.....
Nicaragua .....	197,569	125,594	.....	.....
Portugal .....	10,019	17,704	68,719	138,565
Formosa .....	.....	.....	.....	51,091
United Kingdom .....	.....	.....	15,088,710	907,643
U. of So. Africa .....	.....	.....	5,443,151	629,248
Spain .....	.....	.....	.....	463,086
Colombia .....	.....	.....	.....	403,590
All Others .....	151,297	100,078	91	293,751
Total .....	1,034,967	905,873	21,005,995	3,745,678

\*United States Department of Commerce Statements.

\*In troy ounces.

The international sale of transit gold—imported only for refining and re-export under United States Treasury licenses—has an effect on United States reserves. In 1950, there was a decline of transit gold shipments to the United States.

Fear that the United States might devalue the dollar by increasing the price of gold has prompted many foreign buyers to increase their gold purchases. Although the United States Government has repeatedly given assurances that it will not devalue the dollar, this fear still persists and is a contributing factor toward the outward flow of gold from the United States.

Mr. N. C. Havenga, Finance Minister for the Union of South Africa, recently said the following on this flow of gold:



# Reagents and Processes



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AMERICAN

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COMPANY

MINERAL DRESSING DIVISION  
30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK

"It is my firm conviction that unless the leading countries are able to curb the tidal wave of inflation which goes with rearmament, the increasing lack of confidence in paper money will result in a flight to gold which will only be checked by a more realistic price for gold. This flight, which is already in progress on the so called free-market of the world, as for example in Paris, where it recently rose to \$45.00 compared with the official price of \$35.00 an ounce.

"It is also stated that the turnover on the free-market is now more than 1,500,000 ounces per month, which is 50 percent more than the monthly gold production of the Union. To a certain extent, the Union benefits from the higher price on the free-market, because in terms of our arrangement with the Fund, the mines are allowed to sell gold at a premium on the condition that it is used for manufacturing purposes. These premium sales gave the gold mines an extra income of £2,185,000 (\$6,118,000) during 1950, and if the existing scope and prices of sales are maintained, the extra revenue will amount to much more during the current year."

### UNITED STATES EXPORTS OF GOLD IN REFINED BULLION IN 1949 AND 1950 BY COUNTRIES OF DESTINATION.† \*

Country	1949	1950
Canada .....	738	12,150,010
Venezuela .....	128,048	47,711
Peru .....	.....	347,147
Germany .....	14,197	72,106
Kuwait .....	31,220	167,332
Portuguese Asia .....	150,318	76,979
Philippine Islands .....	59,317	67,614
Egypt .....	.....	1,265,675
Poland and Danzig .....	521,479	85,974
Portugal .....	40,647	70,355
Tangier .....	4,126	38,413
Syria .....	50,000	61,201
French Indochina .....	188,672	4,021
Formosa .....	200,012	100,001
China .....	345,255	.....
Mexico .....	242,993	106
All Others .....	291,786	83,542
Total .....	2,168,808	14,633,177

†United States Department of Commerce Statements.

\*In Troy ounces.

In a recent speech in San Francisco, Dr. Donald Hamilton McLaughlin, president, Homestake Mining Company, spoke on the proper price for gold and also noted the flow of gold as follows:

"And now, with paper currencies including the dollar faced with the necessity of a second adjustment resulting from an even more wasteful and destructive war—and still more adjustments to the continuing excessive expenditures of the years of troubled peace—the relative value of our gold stock in terms of what it could command in the world's market is undoubtedly much higher. So far, it is still officially priced at \$35.00 per ounce for international settlements. Its availability on a bargain basis, now to our disadvantage, is reversing the flow in spite of the lack of true dollar balances abroad. (Balances created through ECA by ourselves seem hardly fair to include in my simple minded way of looking at the problem.) Our stocks of monetary gold are, as yet, hardly in danger from this outflow, great as it is, but it is surely indicative of a condition that needs consideration. Gold priced at around \$1,700,000,000 has left the country in the past year. If it continues much longer at this rate, there will be just cause for alarm. A proper correction would be adjustment of the dollars to gold as dictated by the realities of the postwar world."

The United States' gold miner should have the equal opportunities to export his gold for any foreign buyer to purchase under mutually agreeable terms and/or the right to sell his gold at a premium for manufacturing purposes.

G. O. A., Jr.

MINING WORLD



## CAPITOL CONCENTRATES

### DMPA Established to Bring Life To the Lagging Mineral Program

Recently a good deal of fuss was made in Congress about the 40-odd agencies dealing with minerals and how, through poor organization, the program has lagged miserably. As a result, the President finally issued an order consolidating some of the principal agencies involved, such as portions of GSA, DMA, ECA, and DPA. It is likely that related functions of the other agencies gradually will be absorbed by the new Defense Materials Procurement Agency, which will be headed by Jess Larson, formerly administrator of GSA.

By selecting competent men from the mining and metals field, outside the Government, to head the divisions of the new agency and keeping close control of the whole program, Larson can make a valuable contribution to the defense effort.

The following functions will be transferred and consolidated in the Defense Materials Procurement Agency:

From the Defense Minerals Administration: the responsibility for materials supply expansion, including development of supply expansion programs; responsibility for recommending tax amortization for materials expansion actions; and responsibility for certifying Defense Production Administration loans to RFC for materials expansion actions.

From General Service Administration: the responsibility for materials procurement under the Defense Production Act.

From the Economic Cooperation Administration by delegation: the responsibility for serving as the agency to perform Economic Cooperation Administration materials procurement actions.

In the metals and minerals field, the Department of the Interior will retain the regular statutory responsibilities of the Bureau of Mines and the Geological Survey, expanded to provide additional services required by the emergency programs. The Department of the Interior will also continue to administer the domestic exploration loans programs authorized by the Defense Production Act, and will also carry on the priorities and allocations functions with respect to metals and minerals under the act.

General Services Administration will continue its present responsibilities for stockpile procurement. As a rule, however, the GSA will purchase stockpile materials from the DMPA, which will act as the sole government procuring authority for non-agricultural materials.

#### ● Manganese Purchase Program Announced

Part of the long-awaited manganese purchase program has been announced, although only three purchase points have been selected. Based on the Metals Reserve Company's old purchase depots, the General Services Administration will purchase, at Deming, New Mexico, and Philipsburg and Butte, Montana, for the account of DMA, 15 to 40 percent grade at Deming, 15 to 30 percent at Philipsburg, and 12 to 30 percent at Butte. Schedules are subject to various penalties and the purchase price varies widely according to grade and speci-

fication. Interested miners should get in touch with the General Services Administration at Washington and ask for prices and specifications.

On the face of it, the manganese program sounds like a more sensible deal than the tungsten program. The depots will purchase through to June 30, 1956, or until 12,000,000 long dry ton units of manganese are on hand. The latter limitation is not so good as it does not guarantee any real life to the program. It can be assumed, however, that if the tonnage is built up before the time expires, the amount will be increased.

#### ● Tungsten Shortage Is Acute

While the government fools around with an impractical tungsten program, attractive to neither the foreign nor domestic producer, tungsten has become so desperately short that third quarter allotments to users have been cut by 25 percent. If the supply gap is to be filled, domestic producers will have to get a price based on ore which is realistic enough to bring out production from a myriad of small properties. In the meantime, EPS is paying higher than \$65.00 to attract foreign sellers.

While we maintain a price of \$65.00 for tungsten, with a \$63.00 floor, applicable only to Munitions Board specification concentrates, and worth little or nothing at the domestic mine, the British Ministry of Materials is perfectly willing to pay \$73.50 per long ton unit for the same material.

#### ● EPS Can Pay Over-Ceiling Prices

Under a new Office of Price Stabilization order, issued during July, the Emergency Procurement Services of General Services Administration is permitted to purchase domestic strategic and critical materials at over-ceiling prices if it certifies to GSA that the materials are produced from marginal or submarginal mines. As GSA has the authority, if it wishes to exercise it, to make cash advances against production contracts, it may readily be seen that this combination of powers, if liberally exercised, could put a large part of the mining industry on its feet without the dubious help of DMA.

EPS could contract with a mine for, say, 250,000 tons of "X" mineral at a suitable price, advance \$100,000 against the contract, repayable in material if, as and when produced, and many mines could be put into operation speedily and with little or no red tape.

#### ● Suit Filed for Damages Under L-208

After a good many years a major claim has been filed for damages caused by the infamous Gold Mine Closing Order, L-208. The plaintiff is Idaho Maryland Mines Corporation which filed a suit in the U. S. Court of Claims for \$5,021,799 damages.

It has been pointed out many times that L-208 was of questionable legality and the War Production Board always was nervous about it. As the order was based on manpower needs, it should have been issued, if at all, by the War Manpower Commission rather than the War Production Board, or perhaps, in conjunction therewith.



Viewed from the southwest, the repair shop (left), pit crusher plant (behind the shop), the pit itself and the conveyor belt from the crusher plant to the mill are prominent features of the Bagdad mine. The waste dump for upper levels is at the top left.

## BAGDAD LEARNS TO TRUCK

*By switching from block caving to truck-haulage openpitting, Bagdad doubled its production and cut its mining cost by 40%*

There is a big difference between ore and mineralized rock, and there is the same big difference between a mine and a hole in the ground. At many times in the past, the porphyry-copper body at Bagdad could have been considered mineralized rock, but since 1945, when Bagdad Copper Corporation adopted the truck-haulage openpit as its method of mining, the Bagdad has been a mine producing an increasing tonnage of ore.

Two miles north of Congress Junction, Arizona, on U.S. Highway 89, a gravel and dirt road leads 48 miles northeasterly to the end of the road and to Bagdad, a town fabled and famous in United States'

mining lore. Six miles west of Bagdad, U.S. Highway 93, not yet built through Arizona, will some day be a north-south route from Canada to Mexico.

Today, the Bagdad pit is a testing ground for haulage equipment. Three makes (five models) of rubber-tired haulage units are running an endurance contest against one another and against the toughest opponent of all—the cost-accounting record. Since truck pitting began, Bagdad has cut its mining cost by 40 percent, more than doubled production, has upped mill capacity correspondingly, and at the same time greatly increased sulphide recovery in the mill. Problems of

water supply and tailing disposal have been licked, and Bagdad is now ready for an even greater expansion.

### Porphyry Copper-Moly

The quartz monzonite-copper orebody at Bagdad dips at 10 to 15° toward the northeast, averages about 170 feet in thickness, and is capped in most places by 200 feet or more of barren Gila conglomerate. The copper occurs mainly as copper glance (chalcocite) with smaller amount of copper pyrites (chalcopyrite); average copper content is 0.9 percent. In some streaks and fissure fillings, the ore is rich enough in copper for selective underground mining. The orebody also contains an average of about 0.5 pounds of molybdenite per ton, and, like the copper, it occurs in some high-grade streaks and lenses.

Lying over the bed of sulphide ore, is a 150-foot zone of copper-oxide mineralized quartz monzonite not rich enough for conventional mining, milling or smelting but, once exposed by mining of the overlying overburden, this low-grade is rich enough to drill, blast, haul, stockpile, and leach. However, because it is high in lime and low in pyrite, the low-grade must be leached with acidified water.

### How to Mine the Orebody

How to mine such an orebody? Should it be leached, selectively

E. R. Dickie, treasurer and general manager of Bagdad Copper Corporation, is a strong believer in free interchange of operating and cost information among members of the mineral industry. Under Dickie, Bagdad became a mine.



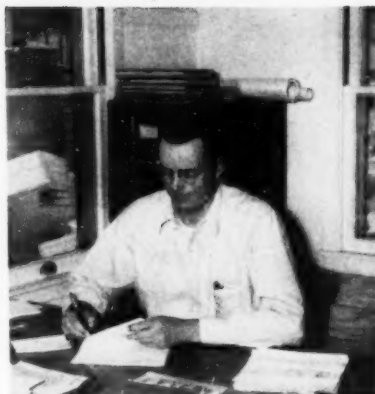


mined for copper, selectively mined for molybdenum, block-caved, or pitted? Selection of a mining method is perhaps the most hair-graying decision a mining man is ever called upon to make. Bagdad has gone through 45 varied years of mining—mining by various methods conducted by a great many different men. During those 45 years, some of the men turned their first gray hair, others lost their money, still others lost their freedom temporarily, but only the last group found what they were looking for—a mine.

### In-Place Leaching Failed

The Bagdad claims were discovered in 1886 and in 1906 were worked by the Giroux Syndicate with small success. Then, a new company, the Bagdad Copper Company, took a turn at the mine.

In 1919, the Arizona-Bagdad Copper Company took over the claims, churn-drilled them, proved a section of the orebody much as it is known today, and did underground work which resulted in small production. In 1925 and 1926, Arizona-Bagdad conducted an interesting, somewhat encouraging experiment in which the ore was leached in place. Workmen dug a trench around a square block, 300 feet on each side. After six months of water feed to the trench at a rate of 15,000 gallons daily, a "leaching solution" was fed at a rate of 15,000 gallons daily. Lack of money and water, and the excess of lime in the orebody defeated the project.



LEFT: General superintendent J. H. "Jim" Cazier signs a group of purchase orders. Jim has worked at many phases of mining—exploration, engineering, production, and management—in both underground and surface operations. RIGHT: Accountant Maurice Than keeps the cost tally on the equipment in the mine and mill. Than instituted the system of cost analysis, a vital part of Bagdad's equipment studies.



In 1927, Bagdad Copper Corporation succeeded the Arizona Bagdad Copper Company, and, in a 50-ton pilot plant, tested a system of recovering copper by selective flotation, roasting, leaching, and electrolysis. In 1929, just prior to Wall Street's Black Friday, after sinking 130 churn-drill holes and closely proving a larger part of the orebody, the company made plans to spend \$7,000,000 to block cave and mill 3000 tons of ore per day.

Greatly scaling down its plans after the stock-market crash, the company completed a 200-ton mill in 1930 and brought mine production up to 150 tons daily.

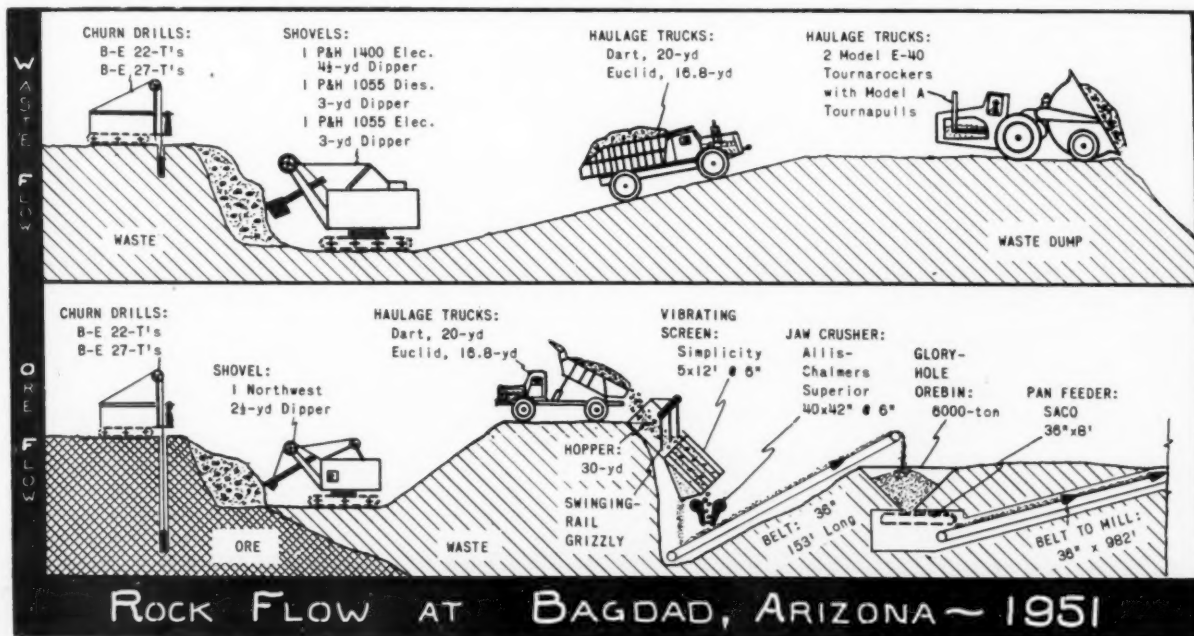
### Block-Caving Broke Even

In 1935, with the depression still raging, the operation was concen-

trated first on selective mining of high-grade molybdenite, then on high-grade copper ore. In 1936, a block-caving project was planned and started; in 1940, it made an operational profit of \$1054, still not enough.

From 1941 to 1944, with the help of a \$2,500,000 RFC loan, the company installed a 2500-ton flotation mill, renovated the mine for large block-caving production, built a 70-mile, 69,000-volt transmission line to bring in power from Parker dam, and built a housing project, a tailing disposal line, and a road from Bagdad nearly to Hillside.

In 1944, J. C. Lincoln, president of Lincoln Electric Company, acquired stock control of Bagdad Copper Corporation and appointed E. R. Dickie as general manager.





LEFT: The P&H 1400 electric shovel dumps a 4½-yard dipperload of gravel into the deep bed of an E-40 Tournarocker. RIGHT: Spotter Lee Richardson tells him where to dump, and Gene Walker backs his "Rocker" in to the bank, sets his rear brakes, starts the dump hoist, and sends 33 yards of gravel over the bank of the waste dump.

By early 1945, block caving had proved only partly successful: Labor was in short supply. The ore-body was relatively thin for block-caving and so required a high ratio of development work per ton of ore.

#### Truck Pit Makes Money

Then, a new chain of events and decisions brought Bagdad to the system that made it a mine: On April 29, 1945, miners blasted 150,000 tons of surface ore into the open glory-hole of a caving block. In the next step toward pitting, a contractor did minor stripping, trucked away waste, and trucked clean ore to the caving glory-hole.

Later in 1945, the company made its big decision: make a complete switch from block caving to truck pitting. By early 1947, a pit crusher system, glory-hole orebin, and conveyor system to carry crushed ore from the pit to the mill had been installed. By early 1948, the con-

version to pitting was complete; all ore mined since then has come from the pit.

In February, 1950, a mill expansion was completed which brought capacity up to 4000 tons per day. New equipment in the pit, and advancement of pit development and stripping brought ore production up to 90,000 tons per month in 1950 and to approximately 110,000 in 1951. In the mill, sulphide-copper recovery has been raised from about 85 percent to about 96.5 percent, the highest recovery in the porphyry-copper industry.

Today, with about 20,000,000 tons of 0.9-percent copper ore in reserve, with reserves expanding, and with the free world calling for more and more copper, Bagdad is making plans to more than double its present facilities.

#### Bagdad's Pit-Mining Method

Briefly, the system of mining at Bagdad is as follows: Benches are

established at 45- and 50-foot vertical intervals. Stripping of waste starts at high elevations on the sides of Bagdad canyon. Ore, waste, and low-grade are broken by churn drills, loaded by shovel. Trucks carry sulphide ore to the pit crusher plant, from where it is carried by a long belt to the mill proper. Trucks carry low-grade oxide ore to extend the downstream side of the new Maroon tailing dam; there it will be acid-leached at some future date. Trucks carry barren waste (mostly Gila conglomerate which occurs as overburden) to a waste-disposal area about ¾ of a mile northeast of the pit.

Two Caterpillar D-8 dozers, one International TD-24, one Tournado, and one #550 Adams motor grader are used for general work in the pit, at the waste dump, and on the roads.

#### Diamond Drill to Explore

Bagdad operates its own diamond drill, a Joy 22-HD. McClintock Diamond Drill Co., of Spokane, Washington, operates its own drill under contract. Drill crews sink vertical holes with six AX bits to depths which usually do not exceed 500 feet. Cores and sludges are logged and assayed at 5-foot intervals.

#### Churn Drill to Break

Churn drills, sinking 7-inch holes to a point 5 feet below grade line, are used for all drilling at Bagdad. Drillers use a short length of casing in starting a hole, remove it when they finish the hole. The front line of holes is spotted about 11 feet from the top of the bank; second and third lines are drilled to give an even, triangular pattern of holes; and the entire three lines are blast-

Chief engineer George Colville stands on the southerly edge of the pit. George is a pipe-smoking Ohio State civil engineer who turned miner in 1944.



ed as a group. This multiple-line system (as opposed to single-line blasting) minimizes movement of the drills and shovel, and produces more muck from a given available area.

The Gila conglomerate is somewhat loose, but is cemented strongly enough so that it must be blasted. Bench development starts with stripping in the conglomerate, which drills easily and need not be loaded heavily. Two small Bucyrus-Erie 22-T churn drills chosen for their portability, are used for drilling in the roughest, most inaccessible places. Drilling crews space holes in the conglomerate at 15 to 18 feet apart, and average about 70 feet of hole per shift.

The ore and low-grade are harder to drill and blast. Two Bucyrus-Erie 27-T churn drills are used for drilling the ore and also the lower benches of conglomerate. Drilling crews space holes in ore at 12 feet apart, and average about 40 feet per shift.

#### Deck Charge in Gravel

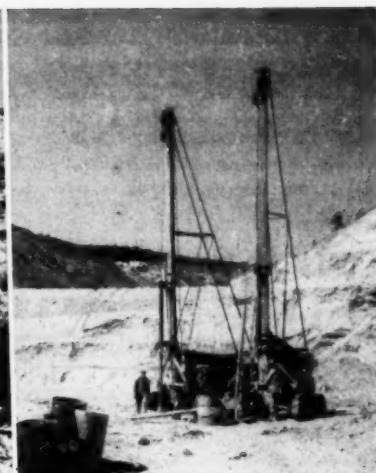
Holes were formerly loaded with Hercules 20-percent or 60-percent bag powder. A recent development is a change from powder in bags to 30 percent extra-dynamite cylindrical cartridges; they are 5 by 24 inches in size, weigh 25 pounds, and are easy to handle; their use has speeded up the loading of holes.

The primer, a cylinder of gelatine dynamite is tied to the blasting lead of Primacord, and is placed near the bottom of the hole.

Loading a typical hole in ore requires 350 pounds of powder and forms a column 21 feet high in the 55-foot hole. The remaining 34 feet is stemmed with mill tailings



LEFT: Driller N. Hernandez and helper Guadalupe Hernandez sink an exploration hole with a Joy Model 22 diamond drill. The hole is in ore, 502 feet down, at a point near the old site of Bagdad village. RIGHT: These two Bucyrus-Erie 22-T's are chomping 7-inch holes into the soft Gila conglomerate. Left to right: driller's helper C. M. Fowler, driller Hubert Melton, and driller's helper Robert Hanne.



or with gravel (Gila conglomerate).

Regarding the use of deck charges, mine superintendent Olaf Hondrum says "we load whenever we find that the bottom load does not extend high enough (about 20 feet) to properly break the upper rock. In deck loading, we place one-third of the powder 20 feet from the top of the hole. Two leads of Primacord, one to the bottom charge and one to the deck charge, are used." Holes in waste usually require only 200 pounds which forms only a 12-foot column of powder, and so must be deck loaded.

#### Strong Primacord Pays

Bagdad has recently started using a single lead of the new plastic Primacord, rather than a double lead of conventional, in all drill holes. As Olaf Hondrum explains it, "at

times we use coarse, angular tamping, and in the past felt that missed holes were caused by severing the lead within the hole. The plastic Primacord has more tensile and shear strength, and more resistance to abrasion than the conventional. We have not had a missed hole since we started using plastic."

Powdermen run a doubled strand of conventional Primacord along the group of holes to be blasted and tie the blasting leads from each hole to this running lead or trunk line. Then, just before the blast, they attach a Hercules No. 6 cap and fuse to each end of the trunk line, and set off the blast.

#### Open Cap for Boulders

Because primary blasting breaks the waste to fine size, secondary blasting of waste is seldom neces-

LEFT: The P&H 1400 electric shovel fills the bed of a Dart 140-TC with Gila conglomerate. Vibration when the shovel moves shakes the bank loose. RIGHT: Ben Sipes operates the twin 3-stage hoists of the 140-TC and the 20-yard load of gravel slides down the waste bank.







LEFT: John Seismore has just backed his Euclid 15-1D in to the Northwest ore shovel for a refill. The ore breaks into angular chunks. RIGHT: The "Euc" delivers its 16.8-yard load to the crusher plant. The flow of ore is from truck, to hopper, to crusher, to glory-hole arabin, and then by belt to the mill.

sary. Primary blasting of ore, however, breaks it into coarser sizes and leaves some boulders which must be rebroken so they will go through the 2½-yd. shovel dipper, and so they will pass through the jaw crusher. The shovel operator noses large boulders aside as he comes to them. Then, the cleanup doorman pushes them into a pile out of way of the loading zone. When a pile of boulders has accumulated, powdermen tie 7 to 12 sticks of Hercules Gelamite 5X powder into a bundle and fit the bundle into a niche or weak point in the boulder. A running lead of conventional Primacord (cheaper than plastic) connects to the blasting lead from each charge, and is attached to a No. 6 cap and fuse. The charges are mudcapped if mud is conveniently available (it usually is not). Large boulders are sometimes capped with 5-inch cylinders rather than 5X stick powder, but powdermen prefer the faster-acting stick powder.

Night foreman H. E. Stewart and mine superintendent Olaf Nordrum are standing on the edge of the 2120 bench on the east side of the pit. Starting to work in 1945, Olaf has spanned the conversion from underground to pit operation.



### Big Units on Waste

Foremen make the final decision as to whether broken rock is ore, waste, or low-grade. The problem is simple because the Gf's, conglomerate is easy to differentiate from the chalcocite-enriched, copper-stained, gray monzonite ore. The boundary where low-grade meets ore is determined by churn-drill records and on-the-spot sampling.

Bagdad is currently mining four tons of waste for each ton of ore, so the big loading and hauling jobs are in the waste. A P&H 1400 6½-yd. electric shovel equipped with Magnetorque hoist is the main loading unit. It is kept working in the central waste zone of the pit and moved as infrequently as possible. A P&H 1055 3-yd. diesel shovel is used for loading in the outer zones and is moved more frequently. A new P&H 1055 electric, delivered in June, is used mainly for waste loading. A Northwest

2½-yd. shovel now handles all ore loading; the operator makes on-the-spot ore-waste decisions.

### The Haulage Contest

Working a pit which has haulage grades up to plus-16-percent, Bagdad Copper Corporation now has five different models of haulage units, 18 units in all.

Two Model E-40 Tournarockers drawn by Model A Tournapulls are used mainly for stripping. Each of these units carries a payload of about 40 tons, and is equipped with Allison engine burning butane, Schneider torque converters and Tournamatic transmission. Costs for haulage by various units at the Bagdad pit (see table) do not include the E-40 Rockers, which have been in use for only a short time.

Two Model 140 Dart 20-yd. trucks carry a payload of about 25 tons. They are equipped with rear springs and powered by Hall-Scott butane motors. The high unit cost of haulage was caused largely by service and inability to obtain parts for the motors. Use of trucks equipped with rear springs has reduced the cost of tires and tubes—one of the major costs in truck haulage. As E. R. Dickie, treasurer and general manager of Bagdad Copper Corp. says, "The tire mileage on this type truck is 50 percent more than on the dead-axle type."

Six Euclid 15-1D 16.8-yd. trucks have been in service for about 2½ years. The Buick DC-1125 240-hp. motors which power the Euclids were in service for an average of nearly 6600 hours before being overhauled.

The most recent competitors in the pit, in service since December, 1950,



are four new Euclid 54-TD and four new Dart 140-TC trucks.

The new Euclid 54-TD's are the same as the 15-TD's except that they are equipped with rear springs.

The new Dart 140-TC's are equipped with Fuller 1220 transmissions, Twin-Disc three-stage torque converters, and are driven by Buda DAS-1125 350-hp. supercharged diesels. They are equipped with Ross cam-and-lever steering (hydraulic with mechanical standby) and "neckers' knobs" are standard equipment on the steering wheels.

### General Cost Conclusions

Working with this variety of haulage equipment, and studying costs closely in a system instituted and kept up by accountant Maurice Thon, Bagdad had reached these important conclusions:

1) Rear springs increase tire mileage by 30 percent, and cost of tires is one of the three major costs.

2) Torque-converter drives effect a big saving by reducing the cost of maintenance and repairs, another cost item.

3) In general, the bigger the haulage unit the lower the cost. With bigger units, the cost of labor, the third major item, is reduced.

In summary, Bagdad's system for reducing total haulage cost is reduction of the three major cost items: tires and tubes; maintenance and repairs; and labor.

### Crush at Mouth of Pit

Truckloads of ore are dumped into a small receiving hopper at the pit crusher plant. The pit crusher plant serves three major purposes. The jaw crusher reduces the size of ore so that the ore flows, pan-feeds, and conveys readily. The glory-hole orebin provides storage for about 6000 tons of crushed ore. The conveyor belt to the mill, 982 feet long at

TABLE SHOWING COST OF HAULING ONE TON OF MATERIAL IN BAGDAD PIT

	Euclid 15-TD (old)	Dart 140 (old)	Euclid 54-TD (new)	Dart 140-TC (new)
Labor	\$0.0150	0150	0150	0160
Taxes	0005	0007	0005	0007
Vacations and Bonus	0007	0007	0007	0007
Tires and Tubes	0135	0150	0090	0090
Lubrication	0025	0030	0024	0035
Miscellaneous	0009	0120	0006	0045
Maintenance and Repairs	0231	0230	0157	0081
Ind. Insurance	0015	0015	0015	0011
Fuel	0075	0120	0080	0087
<b>TOTAL</b>	<b>\$0.0750</b>	<b>0144</b>	<b>0064</b>	<b>0460</b>

<sup>1</sup> Costs for old units for 1950 and first quarter 1951.

<sup>2</sup> Costs for new units are for first quarter 1951 only.

a slope of plus 17½°, eliminates a costly truck haul.

The hopper into which the trucks dump the ore holds 30 yards, and feeds the ore through a swinging-rail grizzly which stops boulders that would choke the crusher. The operator muddies any rock which will not pass through the grizzly. Ore flowing toward the crusher passes over a Simplicity 5 by 12 foot vibrating screen set for six inches, and the oversize passes into an Allis-Chalmers 42 by 40 inch Superior jaw crusher set at six inches.

### Glory-Hole Origin

A 36-inch-wide by 153-foot-long belt carries the crushed and under-size ore to a glory-hole orebin. The glory-hole is an inverted conical excavation in natural rock, sides slope at 45°. Ore flows from the belt into the glory-hole, is stored there and drawn as needed by a Stephens-Adamson 36-inch by 8-foot pan feeder. The pan feeder is installed in a mined-out room directly under the apex of the glory-hole. A 36-inch by 982-foot U.S. Rubber belt runs on Rex rolls and idlers from the pan feeder through a sloping tunnel which runs upward toward the mill and breaks surface halfway between the glory-hole and the mill.

The glory-hole orebin has proved economical and easy to maintain. One man, a pan-feeder operator,

stays on duty at the feeder to service it and watch for trouble, and to shut it off in the event of a failure or trouble on the long belt.

### And New Taxation

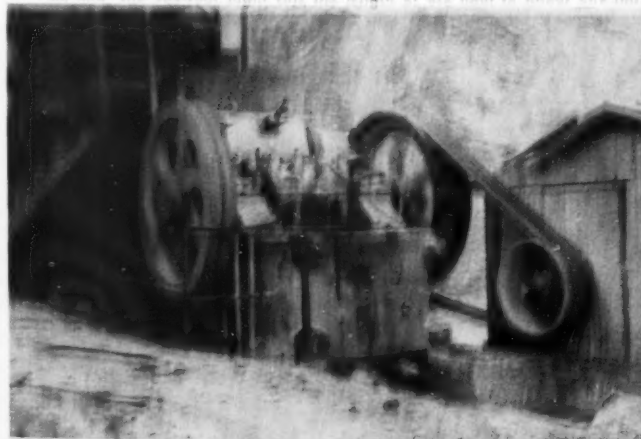
Today, Bagdad is a mine. And with its long history of heartbreak and its newly found hard-won success, Bagdad Copper Corp. is an interesting study in mineral taxation.

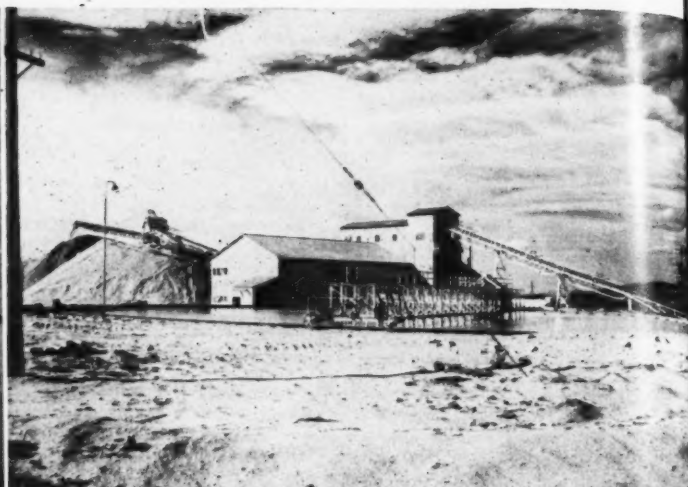
Men who levy taxes only for the purpose of getting funds for government expenses would tax the mine just as they would any other business.

But the early operators of Bagdad—the men who gambled and lost their money, time, and sometimes their freedom—would remember that Bagdad had 40 early years of losses. They would tax Bagdad remembering that it is a part of the mineral industry, our most basic industry, that the mineral industry is one of financial risk, and that the industry as a whole must be allowed to make a profit.

With its mining problems largely solved, Bagdad's management turned next to problems of milling, water supply, tailing disposal. *Mining World* will carry the story of Bagdad's concentrator in an early issue—a story of how careful milling control enabled Bagdad to make the highest copper recovery in the industry.

LEFT: "Crush the ore as soon as possible" is a maxim in pit-mining circles. This Allis-Chalmers 42-by 40-inch Superior jaw crusher breaks six to minus-6-inch size at the mouth of Bagdad pit. RIGHT: This belt runs up a 17½° slope from the crusher plant, near the mouth of the pit, to the mill. The 982-foot flight cuts the length of ore haul to about one-third. The 36-inch U. S. Rubber belt rides on Rex rolls and idlers.





LEFT: This aerial view of the Round Mountain mill gives an idea of the size of the tailing piles. As a comparison, the stockpile (right of the 250-foot Dorr thickener) consists of about 200,000 tons of ore. RIGHT: This picture of the mill was taken just a year ago, in 1950. The 250-foot Dorr thickener (the lake in the foreground), the feed belt to the mill (right), and the mill building all look the same today. But the tailing pile (left) has grown to mountainous size.

## THE ROUND MOUNTAIN MILL

*For low-cost treatment of its placer gold ore, Round Mountain chose a mill with a flow scheme adapted from dredging practice*

The Round Mountain Gold Dredging Corporation mine and mill at Round Mountain, Nevada, are star performers in North America's post-war gold show. Designed to process approximately 17,000 tons of free-milling alluvial gold ore daily, the plant is now in its second year of operation.

After more than a year of production, the mine operates by basically the same system as in 1950. The mill has been tested, altered as necessary to eliminate bottlenecks, and is now running smoothly.

### Review of Mining System

Following, briefly, is the Round Mountain system of mining: The

pit today is deeper, wider, and longer than it was a year ago; but the mining system is unchanged. Ore flow starts with a dragline working a heavy, toothed, scarifying plate up and down the 70° pit bank. The plate was recently redesigned, and equipped with four heavier digging teeth, two of which are similar to but smaller than those on a surface ripper. Ore flows down the bank to a 7½-yard Bucyrus-Erie shovel (the only loader in the pit) which dumps it into a hopper at the end of a pendulum-conveyor unit. Ore travels by belt over a grizzly to a crusher mounted as a unit on a car, and then by a series of belts to a 200,000-ton open-

air stockpile from which it is drawn by vibrating feeders to the conveyor belt which feeds the trommel in the mill.

The highest gold values are near bedrock; this valuable bedrock ore at times contains a high percentage of sticky clay which complicates both mining and milling.

### Mill is a Fixed Dredge

The mill flowsheet is similar to that which Yuba Manufacturing Company has proved on its many floating bucketline dredges; the main differences are these:

- 1) More floor space in the mill building allows for more steps in the milling process

LEFT: The 36-inch American belt runs from the mill to the present junction with the Yuba boom stacker at about 9°. From that point, the belt will be extended horizontally in the same direction. RIGHT: In the main office near the mill, Tom Cahill, assistant to the manager, prepares a rough draft of the mill flowsheets which appears with this article.



and a consequent increase in efficiency.

- 2) Tailing is disposed of by an extensible system of two boom stackers rather than by the fixed stackers of a forward-moving dredge.
- 3) Because the mill has no dredge pond, a 250-foot Dorr traction thickener is used for recovery of water

These are the main circuits of the mill:

**Trommel.** At Round Mountain, as in most placer operations, preliminary sizing results in concentration. The trommel rejects plus- $\frac{1}{2}$ -inch material (about 40 percent of the total mill feed) to tailing; the valuable minus- $\frac{1}{2}$ -inch material flows to the next mill circuit.

**Screens.** A bank of four vibrating screens divides the minus- $\frac{1}{2}$ -inch material into a plus-8-mesh and a minus-8-mesh product, which go to two separate jig circuits—one designed to treat the coarse product, the other designed to treat the fine product.

**Coarse Jigging Circuit.** Coarse rougher jigging effects a concentration of about 8 to 1. The rougher concentrate (hutch product) passes through "boil boxes," over gold tables, to Hungarian riffles which trap the bulk of gold, and then passes to a cleaner jig. Cleaner-jig concentrate passes to the final grinding-and-recovery circuit.

**Fine Jigging Circuit.** The fine jigging circuit consists of a Dorr Hydroseparator which eliminates clay and fine, lightweight materials; and a system of jigs, tables, and riffles similar to the coarse circuit.

**Grinding - and - Recovery Circuit.** In the final circuit, cleaner concentrates from the fine jig circuit

#### Major Electric-Motor Drives at Round Mountain Gold Dredging Corporation

Equipment	Type of Drive	Motor
Bucyrus-Erie 170-B Shovel	Ward-Leonard	375-hp, 4160-v, General Electric
Pendulum Conveyor	Gearmotor to Chain	100-hp, 480-v, Westinghouse Induction
Birdsboro-Buchanan Crusher	V-Belt	100-hp, 480-v, Westinghouse Induction
Crusher Conveyor	Right-Angle Cone	20-hp, 480-v, Westinghouse Induction
Conveyor 3A	Gearmotor to Chain	100-hp, 480-v, Westinghouse Induction
Conveyor 4	Gearmotor to Chain (3 in Tandem)	3 100-hp, 480-v, Westinghouse Induction
Conveyor 6	Gearmotor to Chain	50-hp, 480-v, Westinghouse Induction
Conveyor 7	Reduction Gear	200-hp, 480-v, Westinghouse Wound-Rotor
Jeffrey Vibrating Feeders	Magnetic Vibrators	
Conveyor 8	Gearmotor to Chain	100-hp, 480-v, Westinghouse Induction
Yuba Trommel Screen	V-Belt to Gear Reducer	100 hp, 480-v, Westinghouse Wound-Rotor
2 Tailing Conveyors	Gearmotor to Chain (2 tandem each conveyor)	2 100-hp, 480-v, Westinghouse Induction
Boom Stacker	Gearmotor to V-Belts	20-hp, 480-v, Westinghouse Induction
Swing	Gearmotor	7½-hp, 480-v, Westinghouse Induction
Hoist	Gearmotor	7½-hp, 480-v, Westinghouse Induction
4 Tyler TyRock Screens	V-Belt	4 15-hp, 480-v, Westinghouse Induction
4 Yuba 4-Cell Jigs	Gearmotor	4 5-hp, 480-v, Westinghouse Induction
Yuba Coarse Sandwheel	Gearmotor to Chain	20-hp, 480-v, Westinghouse Induction
Short Sand Conveyor	Direct Gearmotor	5-hp, 480-v, Westinghouse Induction
Main Sand Conveyor	Gearmotor to Chain	50-hp, 480-v, Westinghouse Induction
8 Yuba 4-Cell Jigs	Direct	8 3-hp, 480-v, Westinghouse Wound-Rotor
36" Dorr Hydroseparator	Variable-Speed	15-hp, 480-v, U. S. Electrical Induction
Yuba Fine Sandwheel	Gearmotor to Chain	10-hp, 480-v, Westinghouse Induction
2 Yuba Fine Sandwheels	Gearmotor to Chain	20-hp, 480-v, Westinghouse Induction
24" Dorr Hydroseparator	Variable-Speed	10-hp, 480-v, U. S. Electrical Induction
Yuba Bucket Elevator	Gearmotor to Chain	100-hp, 480-v, Westinghouse Induction
5 6-inch ASH Sand Pumps	V-Belt	5 30-hp, 480-v, Westinghouse Induction
Small Sand Conveyor	Right-Angle Cone	20-hp, 480-v, Westinghouse Induction
Yuba 4-Cell Jig	Gearmotor	3-hp, 480-v, Westinghouse Wound-Rotor
Marcy 5x10" Ball Mill	V-Belt	100-hp, 480-v, Westinghouse Induction
Dorr Duplex Classifier	V-Belt	10-hp, 480-v, Westinghouse Induction
Yuba High-Pressure Pump	Direct	250-hp, 480-v, Westinghouse Synchronous
Yuba Low-Pressure Pump	Direct	125-hp, 480-v, Westinghouse Synchronous
250" Dorr Thickener	Gearmotor	2 7½-hp, 480-v, Westinghouse Induction
3 Diaphragm Pumps	V-Belt	3 5-hp, 480-v, Westinghouse Induction
1 Diaphragm Pump	V-Belt	10-hp, 480-v, Westinghouse Induction
Deep-Water Well Pump	Magnetic Coupling	100-hp, 2400-v, Elect. Mach. Synchronous
Booster Pump	Magnetic Coupling	300-hp, 2400-v, Fair-Morse Synchronous
Standby Well Pump	Direct	75-hp, 480-v, Westinghouse Synchronous
Standby Booster	Direct	200-hp, 480-v, Westinghouse Synchronous

(Approximate Total 7500 hp)

and the coarse jig circuit are ground in a ball mill to liberate gold particles from host rock. Gold is recovered from the ball mill discharge in a Clark-Todd amalgamator. Overflow from a rake classifier flows over quicksilver tables and is pumped to the slime storage pond. The recovered gold is fine, usually of pinhead size or smaller.

#### Eliminate Barren Oversize

Arriving on the 36-inch conveyor belt from the 200,000-ton stockpile, ore enters the mill, falls to a re-

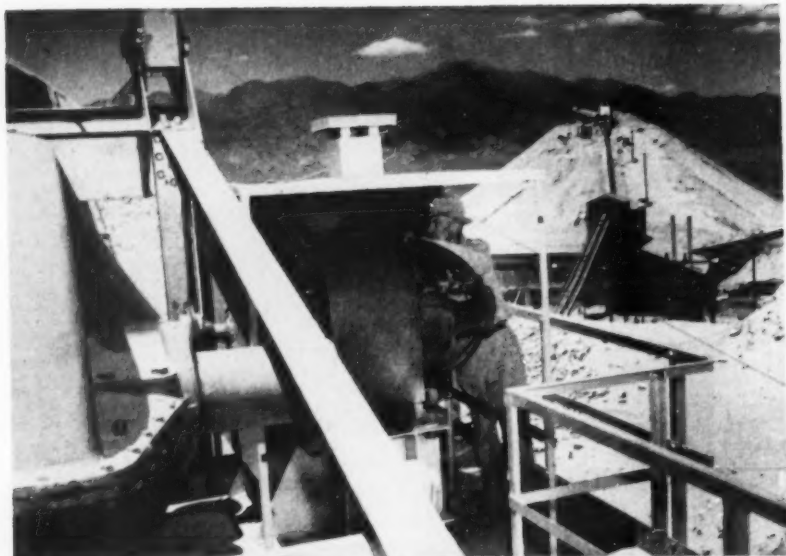
ceiving hopper from which it flows into the mouth of a 9- by 50-foot Yuba trommel screen. Ore passing through the trommel is washed by high-velocity water sprays (re-used water from the traction thickener) from jets in the upper part of the trommel.

The coarse portion, barren plus- $\frac{1}{2}$ -inch material amounting to about 40 percent of the mill feed, falls from the discharge end of the trommel, through a collector and onto one of two 36-inch conveyors arranged in a "Y"; each conveyor

LEFT: Pit foreman Jim Perkins wipes his brow after climbing upslope from the shovel. Behind Jim, the scarifying plate is loosening ore which flows down to the foot of the bank where the Bucyrus-Erie 170-B electric shovel loads it to the hopper can. RIGHT: After more than a year of operations, the method of mining is unchanged. The dragline atop the bank works ore down to the Bucyrus-Erie 170-B electric shovel, which loads it into the hopper. Crushed ore flows from the crusher car (right) up out of the pit and onto the open-air stockpile.







leads upward at 9° from the plant to a 60-foot Yuba boom stacker which swings slowly in a half circle to distribute the tailing.

The minus- $\frac{1}{2}$ -inch product flows from the collecting launder to a 4-way distributing box which equalizes feed to each of four Tyler TyRock 4- by 12-foot vibrating screens. The TyRocks are fitted with 8-mesh screens; plus-8-mesh material amounting to about 30 percent of the mill feed flows directly from each screen to a Yuba 4-cell 42-inch placer jig. The jigs are divided longitudinally with two cells in tandem on each side. Coarse-jig tailing flows over Hungarian-riffles to two Yuba coarse sandwheels for dewatering. From the sandwheels, the coarse portion flows through launders to a conveyor belt which carries it to the main tailing belt; the overflow passes through a dewatering cone called a sand trap. The sand trap underflow goes to

**TOP:** Manager Floyd Jardine inspects the Westinghouse 200-hp. wound-rotor induction motor which powers the 42-inch stacker belt to the stockpile. In the right background is the mill building and one of the twin tailing-stacker belts. **CENTER:** Chief electrician N. O. C. Miller inspects the bank of six 42-inch Yuba placer jigs in the fines rougher circuit. The jigs are installed so that the beds are accessible from the floor above and the hatches and drive mechanisms are accessible from this floor. **BOTTOM:** This is one of the two Yuba 60-foot boom stackers. Tailing is carried up the belt (top right) to a junction point, and then is distributed in a half-circle of 60-foot radius by the boom stacker (left). The Westinghouse motor below powers the climb belt.

*Photos Courtesy Skelton Studios, San Francisco*

the fine sandwheel; the overflow to the 250' Dorr thickener.

#### **Remove the Clay**

The minus- $\frac{1}{8}$ -inch product from the TyRock screens, amounting to approximately 30 percent of the mill feed, passes directly to a 36-foot Dorco Hydroseparator which serves the very important function of eliminating a large tonnage of fine clay prior to fine jigging. Overflow from the Hydroseparator flows to a 250-foot Dorr traction thickener which serves the primary function of recovering water for reuse in the mill. Underflow from the Hydroseparator is raised by a bucket elevator to a 6-way distributing box as feed to the fine-jigging section of six 4-cell Yuba placer jigs. Five 6-inch Allen-Sherman-Hoff packless pumps are installed as a standby for (in parallel with) the bucket elevator. Fine jig tailing flows to a 24-foot Dorco Hydroseparator;

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the Hydroseparator underflow to three Yuba fine sandwheels from which dewatered sand is conveyed to the main tailing belt; overflow to a 10-inch Yuba pump and then to the 24-foot Dorco Hydroseparator again. The Hydroseparator overflow goes to the 250-foot-diameter Dorr traction thickener for settling.

### Clean the Rougher Concentrate

Primary concentration in the coarse and fine rougher jigs carries the recoverable gold into hutch products which weigh only about 8 percent of the initial mill feed. The hutch products from the four coarse jigs flow into a collecting launder, then into a "boil box" where quicksilver is added. From the boil box, the rougher concentrate passes over sloping quicksilvered gold tables, then over Hungarian riffles, and

finally to the coarse cleaner jig, a two-cell 42-inch Yuba placer jig. Coarse cleaner tailing passes to the fine sandwheels. The coarse cleaner-jig concentrate goes to the classifier in the final grinding-and-recovery circuit of the mill.

The hutch product from the fine rougher jigs flows through a similar circuit which consists of a collecting launder, boil box, gold tables, Hungarian riffles, and then passes through a dewatering sand trap to the final grinding-and-recovery circuit where it is joined by the hutch product from the coarse cleaner jig.

### Take the Gold

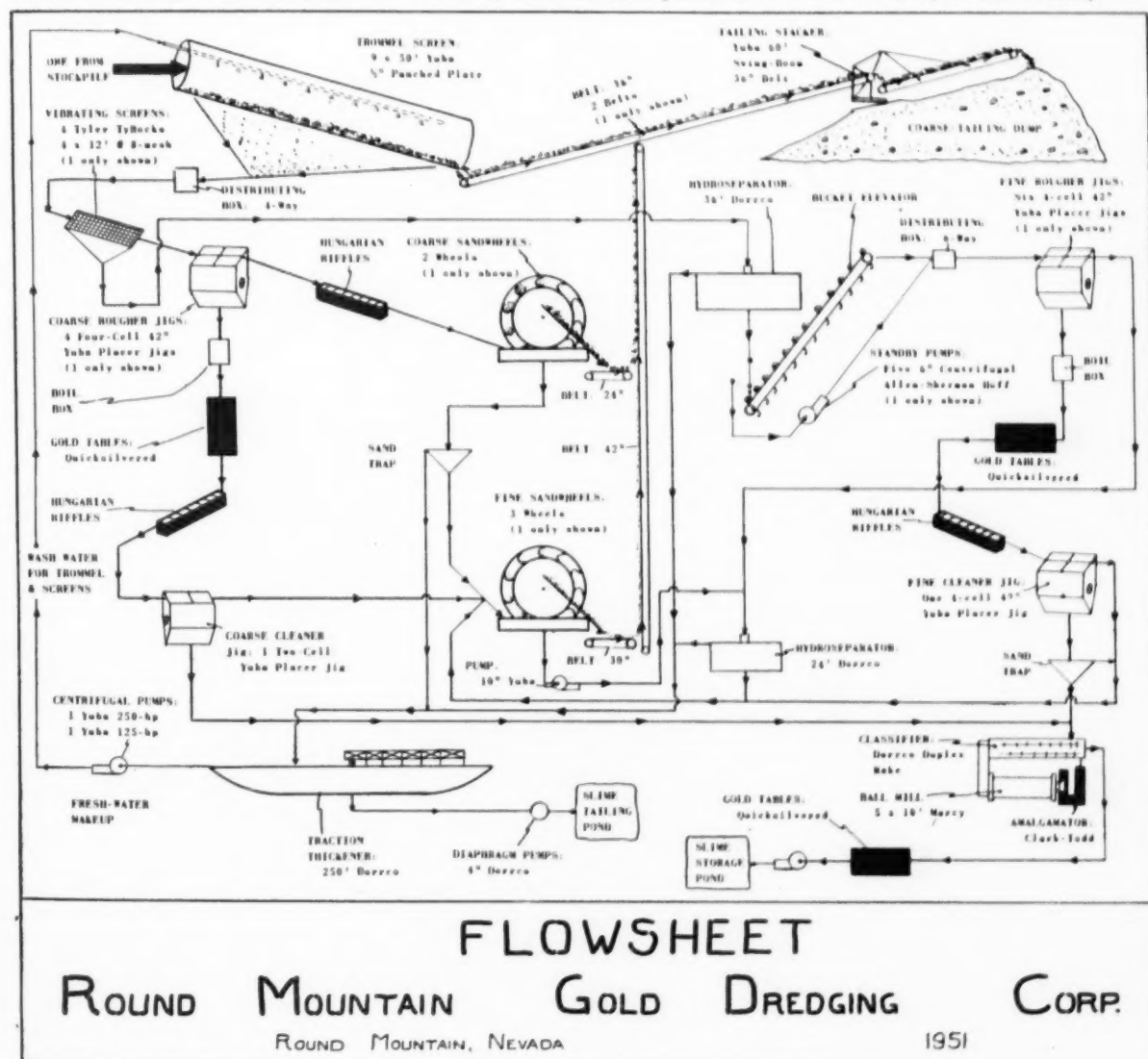
The final grinding-and-recovery circuit consists of a 5- by 10-foot Marcy ball mill, a Dorr Duplex rake classifier, and a Clark-Todd amalgamator. Scalped jig concentrate passes to the classifier; fine waste overflows; classifier sand passes on

to the ball mill, where quicksilver is added, then to the Clark-Todd amalgamator. Overflow from the classifier flows over gold tables and is pumped to the slime storage pond.

### And Send it to the Mint

The assayer cleans up the amalgam by squeezing it in a cloth to form a sponge that is about 45 percent metal and 55 percent quicksilver. He then retorts the sponge and casts it into bricks of gold-silver bullion that is approximately 630 fine in gold and 315 fine in silver. The bullion is sampled, weighed, and sent to the Denver mint.

In a little more than a year of operations, Round Mountain has moved a small mountain of ore from the pit, through the mill to the tailing pile—just the beginning of an estimated 12 to 15 year run on the 67,000,000 ton orebody.



## QUERIDA AND THE BASSICK MINE

Approached from Hardscrabble Pass, all that is left of Querida, Colorado, can be seen at a glance as one rounds a corner and looks ahead over the ruins of the town to the snowy barricade of the Sangre de Cristo range, the west boundary of the Wet Mountain valley. The highway cuts between mine dumps, stone foundations, flumes, old machinery and a crumbling settling pond. A few, scattered buildings mark the townsite but in 1880 and 1881 the place boomed as the riches of the Bassick mine were uncovered.

The original discoverer of the mine was John True. In the early seventies, he and another man, named Charlton, both of whom were sent from Pueblo by Capt. O. H. P. Baxter, John Thatcher and others to prospect for minerals, found a location and sank a shallow hole in conglomerate or agatized quartz. They found no valuable ore, abandoned the prospect and left the region. Later on Hugh Melrose, who formed the Centennial Mining Company, opened a claim, the Musselman, on the hill above True's hole, cut a tunnel into the mountain and employed a small force of men to develop it.

Edmund G. Bassick, who lived in Rosita and who had been unsuccessfully prospecting the region for years, worked for this company,

and in going to and from the mine noticed a spot on the mountain that was covered with float. Some say that in going over the hill he got sand in his shoe and sat down to take it out. He jumped up suddenly for his seat proved to be an ant hill. Starting on again, he decided to return to the spot and demolish the ant hill with his pick. A few inches from the surface he struck rock. He tried another angle and struck more rock. He found a sample of ore which assayed 109 ounces of silver to the ton, and after a little more prospecting on Jan. 4, 1877, he re-located True's original hole and began to develop it, striking rich ore at once.

At the time of his discovery, Bassick was poor. He lived in Rosita and sawed wood in between working assessments on several claims. To eke out their finances his wife took in washing. On the day of his discovery he was unable to pay for an assay of the samples of ore he had found and he asked several of his friends for money to pay for the test, offering them an interest in his claim in return, but they were not impressed. After several weeks a young man at the Pennsylvania Smelting works agreed to make an assay and by next day the news was out that the chunk of rock had run fabulously high in silver.

While working his shaft Bassick found traces of free gold, although at the smelter he was assured that there was no gold in the ore. This made him suspicious and he sacked some ore and sent it to the Black Hawk smelter, where he was unknown. Their analysis showed 150 ounces of silver and eleven dollars in gold to the ton. The mine was so rich that it was easy to raise capital for its further development. Ore worth \$500,000 in gold and silver was taken out in the first year and a half. Now Bassick could not spend his money as fast as it came to him.

In 1879 he sold the mine to eastern capitalists, receiving half a million dollars in cash and a one-tenth interest in the stock of the new company. The New York company which bought the mine worked it successfully for a time, extracting large quantities of ore from it and paying \$425,000 in dividends to the stockholders. But as time went on the company operating the mine became more and more interested in promotion. Finally the property became involved in almost interminable litigation, resulting in the mine being shut down by court order in 1884, after which it lay idle for seven years.

During the years that it lay idle it filled with water, but it was far from worked out for even at a depth of 1400 feet, the orebody showed no evidence of giving out, and it was estimated that \$1,000,000 worth of ore was blocked out before the shut-down. Some of the ore was found in pockets, the best of which ran \$50,000 to the ton. The mine was always a mineralogical curiosity, the ore appearing in shell-like coatings on boulders of various sizes. All the best ore lay in a giant chimney, which was said to have been the chute of an extinct geyser, lying in a porphyry belt.

In 1893 the Melrose Gold Mining Company acquired the property and after demolishing the old buildings, erected a big cyanide reduction plant and an electric light plant on the old foundations. In 1904 a huge body of ore was found from which

Continued on Page 68

The dump and old machinery of the once famous Bassick mine at Querida, Colorado.



## ACTIVITIES OF U. S. MINING MEN

**A. L. Lynn** has been made chairman for the coming year of the Natural Resources Committee of the Chamber of Commerce of the United States. He is vice president of Island Creek Coal Company, Huntington, West Virginia. The 38-man committee has a coal, an oil and gas, a mineral and metal, lumber and pulp and other sections. On the mineral and metal sections are **Horace M. Albright**, president of U. S. Potash Company; **Elmer Isern**, president of Eagle-Picher Mining and Smelting Company; **Lawrence Litchfield, Jr.**, vice president of Alcoa Mining Company; **Donald H. McLaughlin**, president of Homestake Mining Company; and **H. L. Pierce**, vice president of Hanna Iron Ore Company, among others.

**Dr. Harrison Schmitt**, Silver City, New Mexico, mining consultant, in Europe for the U. S. ECA to appraise a mine, is expected to return this month.

**Frank J. Tuck**, formerly of Hayden, Arizona, has been appointed to the position of statistical engineer, Arizona Department of Mineral Resources, Phoenix. Until his retirement last April he was mill superintendent for Ray Mines Division, Kennecott Copper Corporation. Tuck is a graduate of Harvard College and Harvard Graduate School of Applied Science, and had been connected with the Ray mines since 1912.

**R. G. Haworth**, assistant resident manager of the Potash Company of America, Carlsbad, New Mexico, has been promoted to the position of resident manager replacing **P. S. Dunn**. Dunn is now in California employed by American Potash and Chemical Corporation.

**Charles E. Tonry** has resigned from the Southwestern Engineering Company, Los Angeles, California, to accept a staff position with the U. S. Bureau of Mines at the Oil Shale Demonstration Plant, Rifle, Colorado.

**Harvey L. Tedrow** of Alma, Colorado, **Oscar Johnson** of Denver and **John W. Valentine** of Boulder have been re-appointed to the State Mineral Resources Board by Governor **Thornton**. Newly appointed was **George E. Fraker** of Denver.

**HENRY L. DAY** of Wallace, Idaho, president of Day Mines, Inc., was elected president of the Idaho Mining Association at its recent convention at Sun Valley, Idaho. **J. E. Berg**, of Wallace, general manager of the Federal Mining and Smelting Company, was elected vice president. **Harry L. Marsh**, Boise, was re-elected secretary.



**Jack V. Everett**, Crosby, Minnesota, now geologist with the W. S. Moore Company of Duluth, has been in Canada where the company is doing exploration

work. Everett had been a geologist for Pickands Mather & Company before joining Moore.



mining geologist and petroleum engineer with the department.

**GERALD E. EDDY** has been appointed Michigan State Conservation Director, succeeding the late **P. J. Hoffmaster**. Eddy had been chief of the Geological Survey Division of the Michigan Department of Conservation since 1946 and before that

**Dr. William C. Knopf** has been appointed supervisor of the Mulberry, Florida, Experiment Station of the International Minerals and Chemical Corporation. He had been assistant dean of the Northwestern University Technological Institute. In his new position he will work under the supervision of **Dr. I. M. LeBaron**, director of research laboratories.

**Nelson C. White**, formerly assistant manager of International Minerals & Chemical Corporation's Carlsbad, New Mexico, plant, has been named general manager of the Potash Division, which has needed additional officials since its expansion when the firm of Innis, Speiden & Company was bought recently. White also will be vice president of the latter firm which has some activities not coinciding with those of the Potash Division.

**S. Power Warren** expects to terminate his employment by the Defense Minerals Administration shortly and will return to his domestic and foreign consulting work. His home is at Lakewood, Colorado.

**J. L. Christian** has been elected a vice president of the Monsanto Chemical Company. President **Charles Allen Thomas** announced from St. Louis, Missouri. Christian had been general manager of the company's Phosphate Division since 1948, and before that had been manager of the elemental phosphorus plant at Columbia, Tennessee.

**Richard T. Evans** and **Frederick M. Hart** have retired from the Geological Survey, U. S. Department of the Interior after 52 and 51 years of service respectively. Evans had been almost continuously with the Survey's Topographic Division. Hart had been with the Special Map Projects Section.

**Dr. Ralph L. Miller** has been made chief of the fuels branch of the U. S. Geological Survey. He became an associate geologist for the Survey in 1942 and was chief of the Navy Oil Unit of the Alaskan and Foreign Branch until his present appointment.

**Marshall Haney**, consulting engineer, recently completed a preliminary examination of a 500,000-acre tract in the northern part of Tennessee for coal and iron.

**James N. Sherwin** has been elected a vice president of the M. A. Hanna Company, Cleveland, Ohio.

**Jack Chisholm** is now acting superintendent of the Canisteo mine at Coleraine, Minnesota. His appointment—from assistant superintendent—resulted from the resignation of **E. L. Bemis**.

**Frank H. Hayes, Jr.**, acting director of the Copper Division, National Production Authority, Washington, D. C., has been made director. Hayes, a member of the AIME and a consulting engineer, has been in government work since World War II days. **Erwin Vogelsang**, former deputy director of the Tin, Lead and Zinc Division has been made director. He also is a member of AIMA and an independent metals broker.

**Prof. John C. Park** has been appointed dean of the College of Engineering, University of Arizona, Tucson, Arizona, succeeding **Dr. G. M. Butler**, retired. Park has been a member of the university staff since 1926, and has accepted the deanship on a temporary basis.

**FRANK J. SMITH**, vice president of Oglebay Norton & Company, and in charge of the taconite development on the eastern Mesabi range of Minnesota of the Reserve Mining Company has been awarded the honorary degree of Doctor of Engineering by the Michigan College of Mining & Technology. He is an alumnus.



**James H. Brockman** has a job as junior engineer trainee with the Chino Division, Kennecott Copper Corporation, Santa Rita, New Mexico. He just left the New Mexico Institute of Mining and Technology (New Mexico School of Mines) at Socorro.

**Robert E. Tally** has been elected president of the San Juan, Colorado, subsection of the AIME. Tally is assistant manager of the Colorado Raw Materials office of the Atomic Energy Commission. Other officers are **Jack George** of the U. S. Vanadium Corporation, vice president and **Roy Van Zandt** also of USV, secretary-treasurer.

**Howard L. Waldron**, former field editor of *Mining World* is now living in New York, New York, and is employed as associate editor of *The Engineering & Mining Journal*.

**E. M. Fowler**, Hibbing, Minnesota, has been assigned to the Denver office of the DuPont Powder Company as a technical representative. He has worked in California and Utah and has done much work on the blasting of underground diamond drill holes.

**Harold S. Worcester**, Cripple Creek, Colorado, has resigned as director and assistant general manager of the Golden Cycle Corporation and will return to lead-zinc mining in the San Juan dis-



trict of Colorado. Before joining Golden Cycle, he was general manager of Telluride Mines, Inc., at Telluride, Colorado.

**Mayer G. Hansen**, geologist and mining engineer, has been transferred from E. J. Longyear Company's Sales Division to the Mining Division. The Mining Division is expanding its mining and geological consulting services, and its mine contracting work. **L. R. Louis** has been appointed sales manager with headquarters at Longyear's main offices in Minneapolis, Minnesota; he was formerly New York district sales manager of the Fabricating and Equipment Division of General American Transportation Corporation.

**Howard A. Storm** has been appointed assistant general manager of the Colorado Iron Works Company, Denver, Colorado. For the past year, Storm, who has been

with the company more than three years, has been production manager; in addition to his new duties, he will continue to be responsible for production, a major portion of which is devoted to Akins classifiers and separators.

**LeRoy C. Chadwick** has been reelected president of the Intermountain Institute of Consulting Engineers, Salt Lake City, Utah. **Win Templeton** has been reelected first vice president, **S. D. Caplan**, second vice president and **George W. Poulsen**, treasurer.

**W. H. H. Cranmer** was recently reelected president of the New Park Mining Company when the stockholders of that company gathered in Salt Lake City. The stockholders voted to increase the board from seven to eight members and elected **F. Stillman Elfred**, vice president of Olin Corporation, a director. Cranmer

was also renamed president of the East Utah Mining Company. **Clark L. Wilson** was appointed mine manager of the East Utah Mining Company.

**Earl Ferguson Cook**, **Calder T. Bressler** and **James F. McDivitt** have been appointed to the faculty of the University of Idaho's school of mines, Moscow, Idaho. Cook, of Denver, Colorado, has been named an assistant professor of geology; Bressler, who recently received a doctorate at Pennsylvania State College, also was named an assistant professor; McDivitt, a Canadian, has been named an instructor.

## Obituaries

**Herman L. Dauth**, 60, vice president and general manager of Compania Minera Santa Maria del Oro, S.A., Mexican subsidiary of International Mining Corporation, died at New York, N.Y., on July 26. Graduate of the Colorado School of Mines, he was a mining engineer of wide experience in the Western States, Alaska, Bolivia, Venezuela and Mexico.

**WALTER HOVEY HILL**, 83, died June 10 at Grangeville, Idaho. He was a life member of the American Society of Civil Engineers, a senior member of the American Institute of Mining and Metallurgical Engineers; a member of the Northwest Mining Association, the Idaho Mining Association, Grangeville Chamber of Commerce, National Geographic Society, and other societies. He laid down town sites and engineered their facilities, organized and ran mining companies, was once probate judge of Idaho County, and recently had been consulting engineer for various U.S. mining companies, particularly Rare Earths, Inc., of McCall, Idaho. His death ends a colorful and respected career.



**Thomas Addison Janney**, chief metallurgical engineer of Kennecott Copper Corporation's Utah Copper Division, died July 16 at Salt Lake City.


**Charles F. Wethered**, 65, former superintendent of the Federal Mining & Smelting Company, died in May at Eugene, Oregon, where he had lived since his retirement. He graduated from the University of Idaho and joined Federal in 1908 as a mining engineer.

**Bert C. Aubrey**, 48, assayer for Park Utah Consolidated Mining Company, Park City, Utah, died in May.

**Dr. George Salzer**, 54, head of the Colorado School of Mines engineering drawing and descriptive geometry department for 23 years, died June 5 at Denver, Colorado. He held a B.S. and M.S. from George Washington University, and an E.M. and doctorate from Colorado School of Mines.

**Clyde C. Wolf**, 65, died at Douglas, Arizona, July 2. From 1931 until his retirement in February of this year, he had been assistant purchasing agent for Phelps Dodge Corporation.

**Edwin H. Parkhurst**, former president of The Euclid Road Machinery Company, Cleveland, Ohio., died June 22 at Cleveland. He had been president or vice president of several manufacturing concerns before becoming president of Euclid in 1937 until 1951.



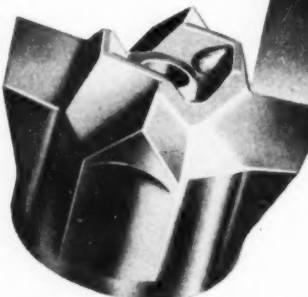
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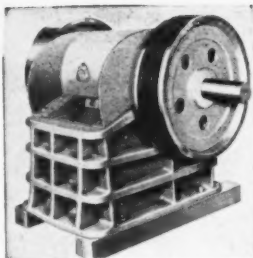
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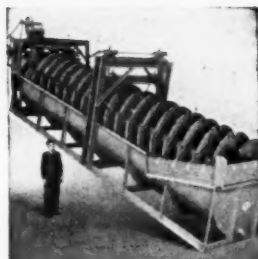




Denver Force Feed Jaw Crusher



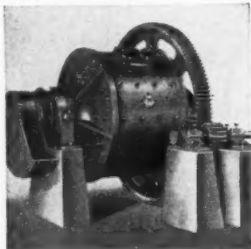
Denver Mineral Jig



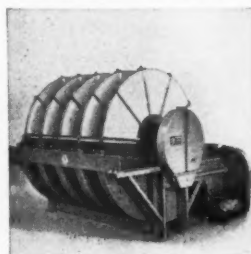
Denver Cross-Flow Classifier



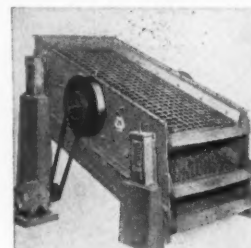
Denver "Sub-A" Flotation Cells



Denver Steel Head Ball Mill



Denver Disc Filter

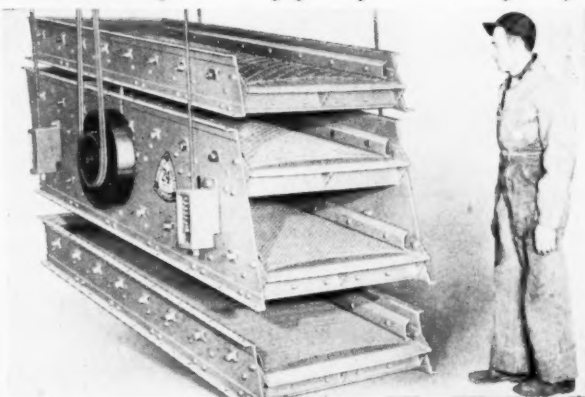


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Continuous tests can be  
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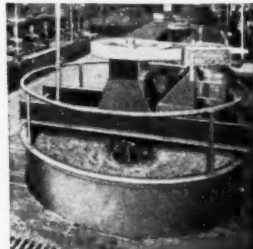
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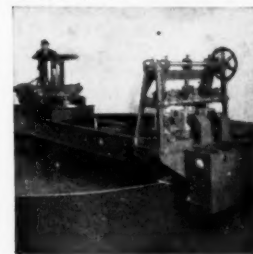
**Heavy Duty Construction ...** provides for 24 hour operation. Less shut down time means more profit.

**Sizes up to 5' x 10' ...** These field proven heavy duty screens are available in 2 x 4, 3 x 6, 4 x 8, 5 x 10, and intermediate sizes. Many sizes in stock.

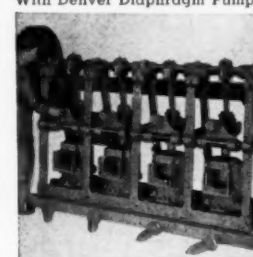
**Engineering and Testing Service ...** Give us details of your screening and other process requirements. Recommendations will be promptly submitted. Write or wire today!



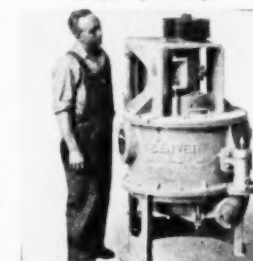
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Sand Pump



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# UNDERGROUND, OR . . .

# IT'S JOY EQUIPMENT



*Above:* For high-production loading and haulage of rock and ore, Joy teams of trackless loaders and electric or diesel shuttle cars get the call underground.

*Right:* Complete range of Joy Stoppers includes the new S-91T, with telescopic feed. Requires fewer steel changes, gives more time for drilling.

*Below:* Joy Wagon Drill specially adapted to drill at any height from toe-holes to horizontals 9' high.

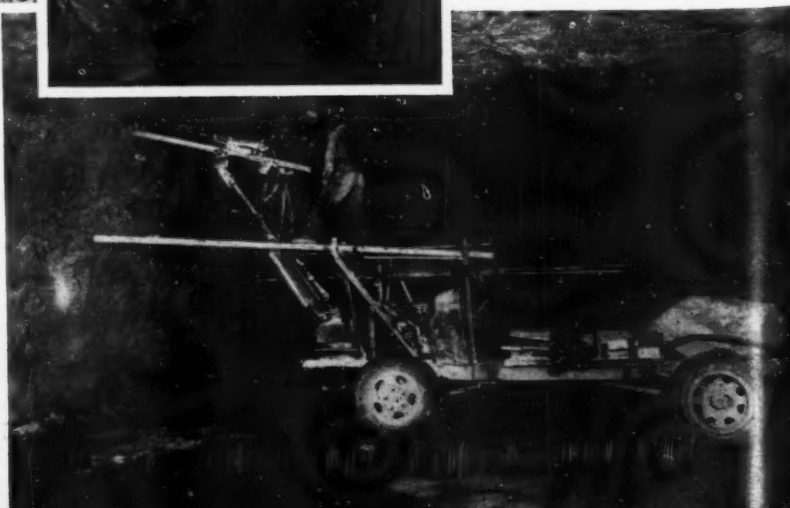


*Right:* The Joy Drillingmobile, a twin-boom, self-propelled, highly maneuverable machine, gives you maximum footage at least cost per foot of hole. Features Joy Hydro Drill Jibs for fast, accurate hole-positioning, and remote control.



*Left:* The Joy HS-15 high speed drill for underground blast holes, or core drilling to 500'. Compact and easy handling, with "in-line" vibrationless drive.

*Below:* Joy Hydro Drill Jibs are versatile units; can be mounted as required to suit individual needs. This truck-mounted Jib is an example.

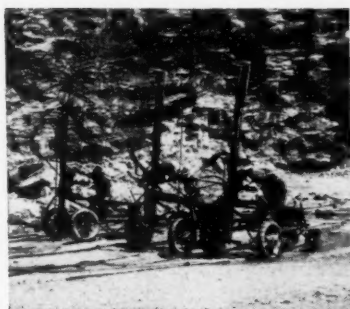


# ...ON THE SURFACE

## FOR GREATER TONNAGE FOR LOWER COSTS



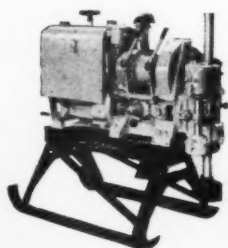
*Above:* Joy builds a complete line of "Silver Streak" Hand Tools, cadmium-plated for rust protection and easier running in.



*Above:* Joy Wagon Drills (Medium and Light-weight models) are easily maneuvered units with positive locking brakes for quick set-ups and balanced drilling on any terrain.



*Above:* Joy Champion Rotary Drills set absolutely new standards in high-speed, economical blast hole drilling, far out-performing all others. Built in two self-propelled models, for diesel, gasoline engine or electric motor drive.



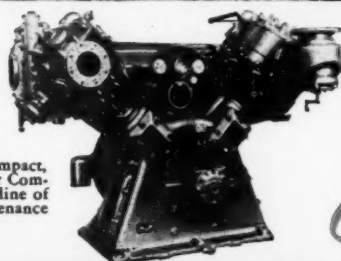
*Above:* Joy Core Drills range in capacity from 250 to 1750 feet of 1½" hole. Screw feed or hydraulic types—gasoline, diesel, air or electric drive.



*Left above:* Joy's popular Series 80 Portable Compressors, with the famous "Econo-Miser" load control, are built in seven sizes, from 60 to 630 CFM.



*Above:* Joy Hydro Drill Jibs are readily adaptable to truck-mounting, etc. for secondary drilling or toe-holes in quarries or open-cut mining.



*Right:* Joy pioneered the compact, modern "package-type" Air Compressor—offers a complete line of highly efficient, low maintenance airplants up to 3656 CFM.

*Consult a Joy Engineer*



W&D M-3363

# JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

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# LONE STAR STEEL



It takes Tournadozer only 45 minutes to clean around 4 draglines and a shovel over a 1.3 mile distance.



With forward speeds up to 15 m.p.h., Tournadozer makes long clean-up runs rapidly and economically. 8 m.p.h. reverse speeds and constant-mesh transmission help the "C" double crawler production on short and intermediate runs.



After 3000 hours work in highly abrasive materials, substantial part of original tread still remains on Tournadozer's 21.00 x 25 low-pressure tires. After further use, these tires will be re-treaded for additional mileage.



**R. G. LeTOURNEAU, Inc.,**  
PEORIA, ILLINOIS



# replaces 3 crawlers with 1 Tournadozer

"Very fine for clean-up work,"

says Supt. **W.L. KENDRICK**

Texas' largest pig iron producer, the Lone Star Steel Co. of Dallas, has greatly simplified and speeded clean-up operations at their Daingerfield open pit mine by replacing three 144 h.p. crawler tractors with 1 high-speed rubber-tired 186 h.p. C Tournadozer.

The 19 m.p.h. Tournadozer regularly serves 3 to 5 draglines and shovels . . . while, previously, each crawler could clean up around only 1 or, at the most, 2 excavators. In addition, Tournadozer handles a lot of widely-scattered dozing jobs . . . is literally all over the mine, 16 hours a day, 6 days a week, helping keep daily ore production at scheduled 15,000 tons. As W. L. Kendrick, Lone Star's division superintendent and a veteran of many years on the Mesabi Range and at Daingerfield, describes it:

"For our work, where speed, mobility and power are essential, Tournadozer has proved very satisfactory. It's a fine machine for cleaning up around shovels, pushing trucks in soft footing, and doing miscellaneous dozing. We are very pleased with its performance."

These "miscellaneous" tasks at present include: blading and cleaning haul roads . . . dozing overburden . . . cutting ramps from haul roads to loading areas . . . preparing dragline sites . . . and hauling equipment. Material ranges from rock and heavy limonite ore (weighing over 4,100 lbs. per cu. yd.) to sand, clay, and even gumbo. Tournadozer does particularly well in pushing trucks through soft going, because its speed and the smooth control of its instant-shift transmission keep it pushing steadily against truck as footing improves and haul speed increases.

**3000 hours, 90% efficiency, tires still good**

With 3000 hours of rugged service on these tough, high-speed assignments, Tournadozer has given over 90% efficiency. Despite the abrasive, rocky materials, the "C's" 21.00 x 25 low-pressure tires still carry a substantial part of their original tread (see photos). After additional wear, the tires will be re-treaded.

This is just one of a series of world-wide jobs where rubber tires, rolling on dirt, sand, rock and ore, are proving far more productive and economical than tracks wearing in dirt. See your LeTourneau Distributor for all the facts . . . let him demonstrate to you that frequent and costly track repairs can be eliminated. Let him show you how Tournadozer's 19 m.p.h. speeds, its simple steering controls, and electric-controlled down-pressure blade will move more dirt at a lower cost.

## READ WHAT MEN WORKING THIS JOB SAY ABOUT TOURNADOZER

**M. J. Hughes, mine superintendent,**  
"It's the best machine I've ever run into for the kind of work we have it doing. It can't be beat in open pit mining."

**R. T. Dudley, mine foreman,** "I don't see how we ran the mine before we had the Tournadozer."

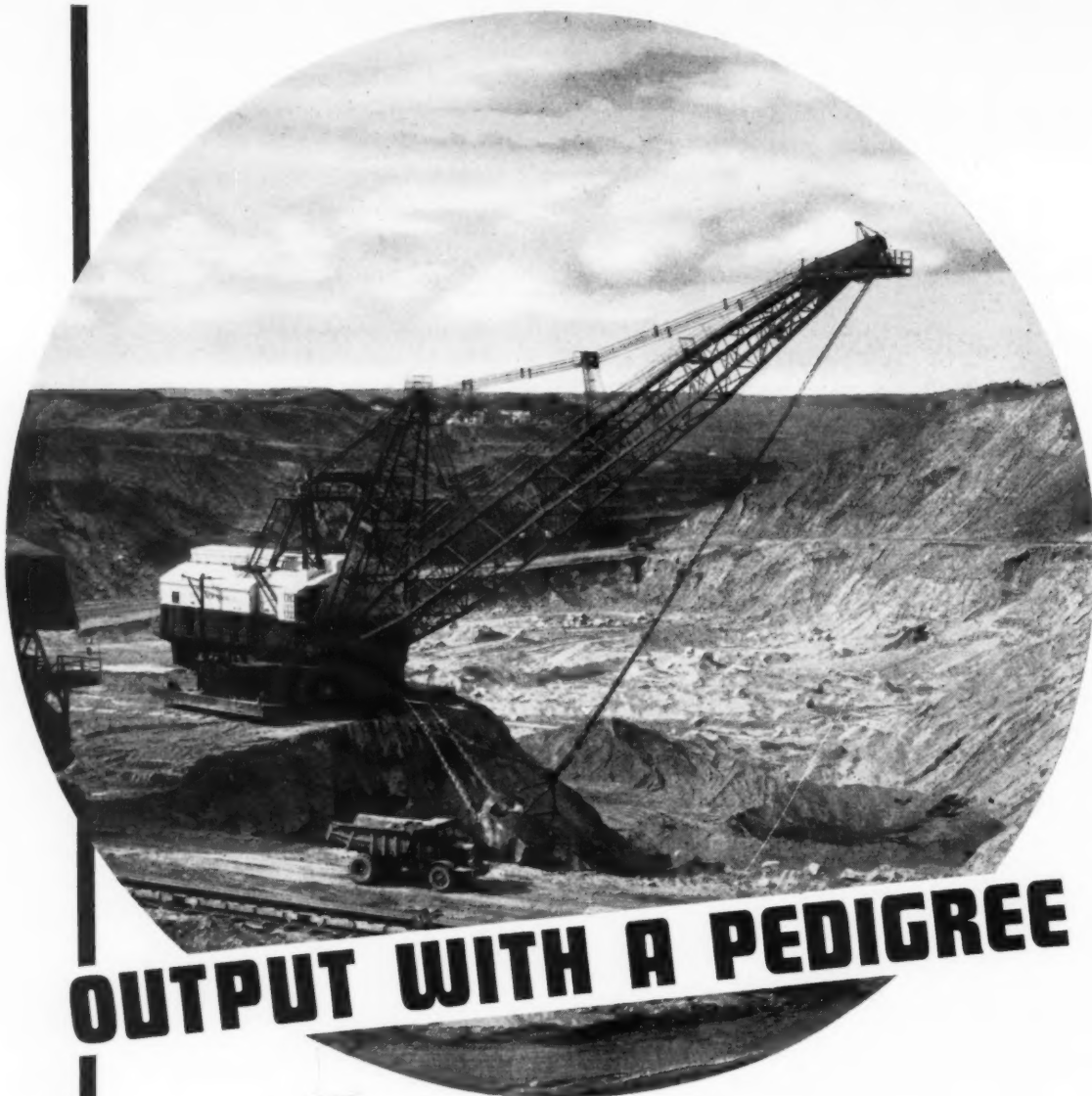
**Wiley E. Martin, Tournadozer operator,**  
"Tournadozer is easy to operate and easier on the operator. It's much faster on shovel clean-up and dozing, blading roads, and pushing trucks. I'd rather run it than a crawler-tractor."

**Enoch Hooton, Tournadozer operator,**  
"You can't beat the Tournadozer for pit work or clean-up."

186 h.p. Tournadozer moves 2½ cubic yards per push. Optional down-pressure blade and torque converter are available on current production.

Tournadozer—Trademark Reg. U.S. Pat. Off. R254

**HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT**



## OUTPUT WITH A PEDIGREE

**T**HE big, low-cost output records achieved by Bucyrus-Erie mining shovels are based solidly on a background of unequalled manufacturing experience. Each excavator in this outstanding  $\frac{3}{8}$  to 30 cubic yard line embodies the principles of design and construction Bucyrus-Erie has gained in building over 75,000 machines of all sizes and types, for work under all conceivable operating conditions in all parts of the world.

This fund of practical knowledge extends to every part of a Bucyrus-Erie . . . from the selection of steels and alloys to the placement of machinery . . . from the selection of power units to the design of caterpillars and boom-point sheaves. The inevitable result is a fast, dependable, smooth-working excavator — correctly adapted to its work requirements, capable of setting peak performance standards now and in years to come.

116LS0

**BUCYRUS  
ERIE**

SOUTH MILWAUKEE, WISCONSIN

# WORLD MINING

The International Department of MINING WORLD

## INTERNATIONAL PANORAMA

**BOLIDEN, SWEDEN**—The Boliden AB mining company is constructing a new iron ore concentrating plant which will have two sections—one for the treatment of Renström ore and the other for other ores of the area. The cost will be from 15,000,000 to 20,000,000 Swedish kronor.

**MONTREAL**—Exploratory drilling of two sulphur deposits 100 miles north of Edmonton, Alberta, Canada, has been started by the Dominion Tar & Chemical Company.

**CARACAS**—The Compania Anonima Venezolana de Diamantes has resumed operation after a three-month shutdown. According to Dr. Frederico Luchsinger, manager, the company hopes to be producing an average of 2,000 carats of diamonds monthly before the year's end.

**BUDAPEST**—Two uranium strikes have been reported made in Hungary, one in the Vertes mountains near Miskolc and another in the Bakoni forest northwest of Budapest. A plant called the Dunav, is being installed 30 miles south of Budapest on the Danube to treat the ore.

**DUISBURG-HAMBORN, GERMANY**—The August Thyssen foundry has resumed production of pig iron at a rate of 40,000 tons a month, after a several years' shutdown. Two blast furnaces are in operation and a third is planned for the end of the year.

**LIMA**—The Export-Import Bank has loaned \$650,000 to a Peruvian tungsten mine operated by Fermin Malaga Santolalla E Hijos. The loan will pay for mine and mill equipment, a power plant, and a new road. Tungsten from this consistent though small producer will be sent to the United States for a six-year period.

**JAMAICA**—The Economic Cooperation Administration has advanced \$3,284,000 to the Reynolds Jamaica Mines, Ltd., to increase bauxite production at its British West Indies properties from 410,000 to 750,000 tons annually. The company has already received \$11,000,000 from ECA.

**HOTSPRINGS, ARKANSAS**—A fifth pitline has been put into operation by the Reynolds Metal Company at its Jones Mills aluminum plant, increasing annual capacity by 42,000,000 pounds to a total of 186,000,000 pounds.

**OSLO**—The Norwegian Parliament has approved the expenditure of \$9,800,000 for an aluminum plant to be built at Sundalsora in Western Norway and to have a capacity of 40,000 tons annually. The total cost of the project will be about \$63,000,000 of which the Economic Cooperation Administration has put up \$24,000,000.

**NEW YORK**—Crude sulphur production in the first six months of 1951 in the United States remains at record levels. Total output from Gulf Coast mines and from gas refineries was about 2,690,000 long tons.

**PORT TALBOT, WALES**—Europe's largest steel plant, the Abbey Works, covering 600 acres along the Bristol channel was officially opened in July. The plant will produce 1,250,000 tons of steel sheet and tin plate annually. Total cost of construction was \$168,000,000.

**QUITO, ECUADOR**—Development of sulphur deposits on the Andean plateau near Tixan and Alausi, Province of Chimborazo, will be undertaken by an Ecuadorian firm now being formed, and the United States company, Chemical Plants Corporation. A sulphuric acid plant will be built at Riobamba in connection with the mining project.

**WASHINGTON**—During the first six months of 1951 contracts were signed for the purchase of \$1,654,000 worth of critical and strategic materials by the Munitions Board.

**WACO, TEXAS**—The Aluminum Company of America plans to build an aluminum smelting plant 60 miles south of Waco with a production capacity of 85,000 tons of aluminum yearly. The plant will use lignite from Milam County as fuel.

**DURANGO, COLORADO**—The U. S. Atomic Energy Commission has approved a substantial increase in the capacity of the Vanadium Corporation of America's mill. An increase in ore reserves and the acquisition of further mining claims will allow greater treatment of vanadium and uranium ores.

**DETROIT**—The Ford Motor Company will spend \$43,000,000 for expansion and modernization of its Rouge Steel Plant to add 190,000 tons of finished steel capacity annually. Total output of Ford finished steel will thus be increased by about 18 percent.

**PITTSBURGH**—The Weirton Steel Company has started erection of a new blast furnace at Weirton, West Virginia. The new furnace will have an annual capacity of 480,000 tons of pig iron.

**WASHINGTON**—A new agency, the Defense Materials Procurement Agency, has been established by the federal government to take over defense material procurement functions now held by DMA, GSA, ECA and DPA.

**SPOKANE**—The American Smelting & Refining Company has started access road building, power line installation and construction of its new 1,000-ton-per-day mill at the Van Stone mine.

**KUALA LUMPUR**—Of the 28,015 tons of fine tin produced in Malaya during the first six months of 1951, 51.8 percent was from dredging and 34.2 percent from gravel pumping.

**HENDERSON, NEVADA**—Titanium Metals Corporation of America will erect the first large-scale self-contained plant for production of titanium metal in the world. By late 1952 the plant is scheduled to produce 3,600 tons of titanium metal per year.

**OURO PRETO, BRAZIL**—The first Brazilian aluminum plant has started operations. Initial output is 2,000 metric tons of aluminum yearly. The company operating the plant, Electroquimico Brasileira, S.A., uses Brazilian bauxite as a raw material.

**STOCKHOLM**—The Höganas AB is building a plant at Höganas, southern Sweden, for producing 20,000 tons of powdered iron per year. Another plant will be built at Koping, central Sweden, to produce 30,000 tons of sponge iron per year.

## INCO Completes Million Pound Expansion

In April, Dr. John F. Thompson, chairman and president of The International Nickel Company of Canada, Ltd., predicted that a 1,000,000-pound monthly increase in the company's production of refined nickel would be accomplished by the end of 1951 in order to meet heavy demands. By the middle of July the company already had achieved this increase as a result of the major program of expansion of underground mining capacity, metallurgical process changes and the installation of emergency facilities at the Canadian plants. Monthly capacity now totals 21,000,000 pounds. The company has spent \$100,000,000 in the past 10 years on expansion, another \$30,000,000 has been authorized, and still more capital is expected to be spent to complete the final phases of expansion.

During 1950, prospecting covered 24,000 square miles, of which 3,215 square miles were surveyed in detail. Exploration drilling in Canada amounted to 260,127 feet, compared to 149,399 feet in 1949. Deliveries of nickel in all forms to the free world amounted to 256,410,543 pounds, an increase of 22 percent over 1949. At the end of 1950 Inco's ore reserves stood at 252,859,725 short tons, about 1,000,000 more than in 1949. At present, besides production increases (see *Mining World*, June) at the Murray Frood-Stobie and Creighton mines (the Creighton is being prepared for block-caving to utilize lower grade ores) in Ontario, the Crean Hill mine in the Sudbury district, closed since 1929, is being dewatered, and the shaft reconditioned. Extensive exploration will follow.

## First Gold Mine Opens In Orange Free State

Just five years after the opening of the Orange Free State goldfields in South Africa, St. Helena Mine has become the first of 13 developing mines to reach the production stage. Ultimately, about 22 mines are expected to be in operation within the area.

The use of rod mills instead of ball mills is one of the unusual features of St. Helena's reduction plant. A milling rate of 60,000 tons per month is expected to be reached by the end of the year.

## Jamaica Bauxite Mine Gets New ECA Loan

An additional \$3,284,000 will be loaned to Reynolds Jamaica Mines, Ltd., by the United States' Economic Cooperation Administration for expansion of bauxite production at the company's mines in Jamaica, British West Indies.

Under a new agreement, supplemental to the contract of January, 1950, Reynolds will increase output from 410,000 tons annually to 750,000 tons. Work is scheduled for completion early in 1952.





By Demitri B. Shimkin

The author was born in Russia, but has lived most of his life in the United States. In 1939 he received a Doctor's degree in anthropology at the University of California. During World War II he was an officer on the War Department General Staff, dealing with Russian affairs. In 1946 and 1947, as a lieutenant colonel, he taught at the National War College. During 1947 and 1948 he was at the Institute for Advanced Study at Princeton University. Since then he has been a staff member of the Russian Research Center and the Department of Social Relations at Harvard University. He has written for *IRON AGE*, *FORTUNE*, *OIL AND GAS JOURNAL* and is the author of *MINERALS—A KEY TO SOVIET POWER* (Harvard University Press, 1951), from which data for this article have been taken.



## IS MINERAL SELF-SUFFICIENCY A WEAK SPOT IN RUSSIA'S ECONOMY?

***This is the first part of a two-part article on Russian mineral strengths and weaknesses. Russian Production, and Foreign Trade in Minerals are discussed. Part II, which will appear in the November issue, will outline Mineral Consumption, Self-Sufficiency, Materials Control, and Reserves and Potentialities.—Ed.***

Despite serious setbacks caused by losses during World War II, Russia's mining industries have undergone tremendous expansion over the past quarter-century. This has been particularly true for the production of non-ferrous metals and fertilizer basics. Furthermore, the last decade has witnessed a pronounced eastward shift in production, and considerable maturation in mining and refining technology.

Nevertheless, the Soviets have been unable to meet their own ambitious goals, intended to permit a break-neck pace of industrialization and economic expansion. The chronic shortage of minerals resulting from this failure has had numerous consequences. The U.S.S.R. has shifted from a net mineral-exporting to a mineral-importing balance of foreign trade. It has sacrificed the healthy growth of housing, agriculture, the transportation network, and light industry to the over-riding needs of heavy manufacturing. It has accepted serious waste from the widespread use of substitutes that have been frequently substandard and short-lived.

In its search for military security, the Soviet Union has also strived to achieve self-sufficiency, through the development of domestic production and through assiduous stockpiling. These efforts have been but partially successful. During World War II, the enormous supplies sent by the United States, Canada and the United Kingdom were indispensable for Soviet survival. Today, although peacetime internal needs for most minerals can probably be met from domestic output, the requirements of the satellites and, above all, the potential demands of a full-scale, prolonged war raise critical problems, especially in regard to non-ferrous metals, petroleum and sulphur minerals.

The known mineral reserves of the Soviet Union are extremely large. In most ferrous metals and non-metals, and in fuel, they are adequate or abundant to permit self-sufficiency for 20 years or more of intensive economic development. On the other hand, the reserves of most non-ferrous metals and other minerals such as diamonds and tungsten range from doubtful adequacy to negligible size. But the situation as presently known reflects primarily the pioneering stage of Soviet prospecting and mining development. Even the preliminary geological reconnaissance which sum up present knowledge of most of the Soviet Union has brought out, beyond question, the great structural diversity and virtually limitless ultimate potentialities of Russia's lands. The wealth of the Urals may

well be duplicated in Turkestan and Central Siberia.

The general outlines of Russia's mineral position are clear. In contrast, the more specific discussions which follow must be viewed as approximations subject to serious error. To be definitely stressed is that the source materials underlying study of the Soviet mineral position vary enormously in reliability, from good to guesses. Their interpretation has also bristled with difficulties. Finally, unprovable assumptions have had to be made all too often.

### PRODUCTION

Under the heading of production, a breakdown by volume, distribution and technology follows. Between 1926 and 1937, total Soviet mineral output, as measured in United States 1937 prices, increased almost five-fold (See Fig. 40.) In the latter year, Russia's mineral production approximated 22 percent of the American, for a coverage including gold but excluding stone, sand and gravel.

This growth in production was accompanied by important changes in composition. True, the production trends in pig iron and copper, coal and petroleum, and asbestos, barite, cement, fire clay and gypsum corresponded roughly to the average. Yet, relatively small increases were achieved in manganese ore, mercury and platinum, as well as in china clay, salt, emery and graphite output. In contrast, chromite, lignite, natural gas, magnesite and talc pro-

duction expanded at rates well above the average, while numerous minerals underwent tenfold growth and more. These included lead, zinc, and tungsten plus the non-metallic bromine, corundum, fluor spar, mica, phosphate rock, potassium salts, pyrite, and natural sodium sulphate. Finally, the production of other minerals still began during these years, albeit on small scales. Among the new developments were several metals: aluminum, antimony, beryllium, bismuth, cadmium, magnesium, molybdenum, tin and vanadium-bearing naturally alloyed pig iron. New non-metallics included natural sulphur, borax, iodine, and andalusite.

### World War II Disrupts Output

As World War II approached, the growth of Soviet mining was restricted essentially to non-ferrous and ferro-alloying metals. In addition, the experimental production of cobalt, rare earths, zirconium and piezo-electric quartz crystals began. But the catastrophes of the war profoundly disrupted the Soviet

mining industries. Even in 1944, after three years of effort and Lend Lease aid, the nation's total mineral output was barely three-quarters the level reached in 1937. Much of this retrogression was a direct consequence of German advances. Overrun were a great part of Russia's capacities for producing or refining pig iron, manganese, mercury, zinc and zirconium, among the metals; the fuels, coal, lignite and petroleum; and the non-metallic minerals, cement, china clay, fire clay, dolomite, graphite, gypsum, phosphate rock (especially superphosphates manufacturing), and salt. The outputs of copper and lead, of petroleum and natural gas, and of barite and asbestos, apparently suffered from overworked equipment, inadequate maintenance, and the insufficiently rapid development of reserves. Yet significant advances also took place during World War II. Despite war losses, aluminum, nickel and lignite production reached new heights. So, too, did the ferro-alloys, tungsten, molybdenum, and vanadium; the non-ferrous metals,

magnesium and antimony; the refractory, andalusite; and bromine, essential for producing aviation gasoline.

### Post-War Rally Accomplished

By 1950, the Soviet mining industries had achieved a remarkable recovery, reaching a level more than 60 percent above that of 1937, more than double that of 1944. As in the pre-war period, important structural changes had taken place in minerals production since 1937. The most notable was the great increases in non-ferrous and ferro-alloying metals output proportional to the total. The increase embraced not only major metals such as aluminum, copper, nickel, and tin, but also lesser ones such as antimony, cadmium, cobalt, manganese, molybdenum and vanadium. Lead and zinc production in 1950 was about double that of 1937. Another significant change has been the increasing importance of coal and lignite relative to petroleum and natural gas, a trend the reverse of American experience.

Economic Regions, 1946: 1. Northwestern; 2. Northern; 3. Baltic (Western); 4. Central; 5. Urals; 6. Ukrainian (Southern); 7. Volga; 8. North Caucasus; 9. Transcaucasus; 10. Turkestan (Central Asia); 11. Western Siberia; 12. Eastern Siberia; 13. Far East.

Mineral Group Designations are:

▲ Ferrous Metals: chromite, cobalt, iron ore, manganese, molybdenum, nickel, titanium, tungsten, vanadium.

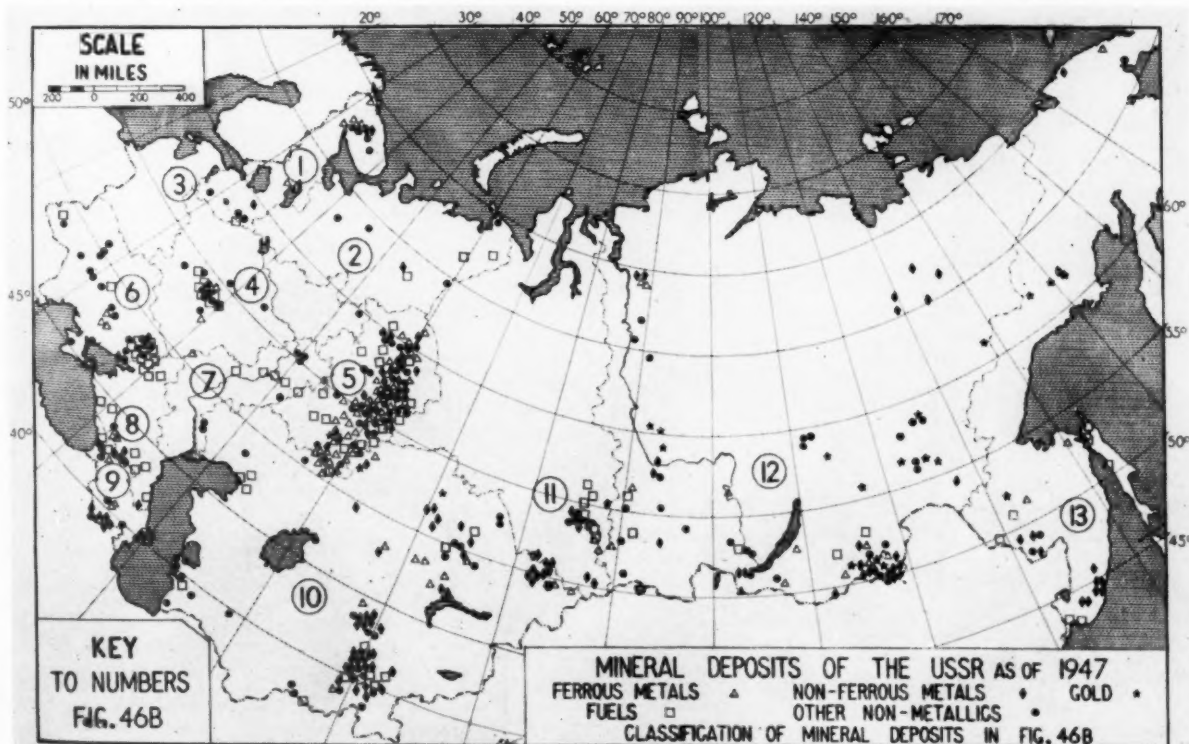
◆ Non-ferrous Metals: antimony, arsenic, bauxite, beryllium, bismuth, cadmium, cerium and rare earths, copper, lead, magnesium,

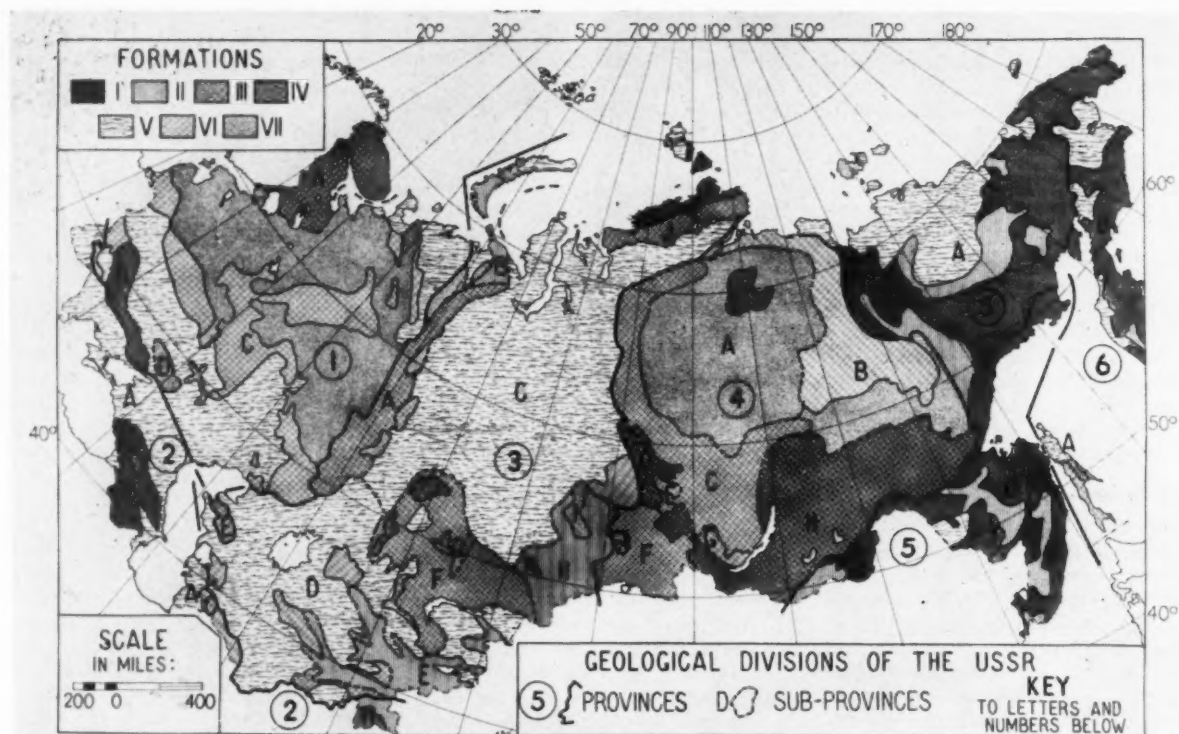
mercury, niobium (columbium), platinum, thorium, tin, uranium, zinc, zirconium.

★ Gold.

□ Fuels: coal, lignite, petroleum, natural gas.

• Other Non-metallics: andalusite, asbestos, barite, borax, bromine, china clay, corundum and emery, diamonds, fluor spar, graphite, gypsum, iodine, mica (muscovite, phlogopite, and vermiculite), phosphate rock, piezo-electric quartz crystals, potassium salts, salt, natural sodium salts, strontium, sulphur, and pyrite, talc.





### MAJOR FORMATIONS

- I Mesozoic and Cenozoic diastrophism, with extensive lavas and acidic (granitic and syenitic) intrusions, rarely basic (dioritic).  
 II Paleozoic diastrophism, with acidic intrusions.  
 III Paleozoic diastrophism with extensive acidic and basic-ultra basic (dioritic-peridotitic) intrusions.  
 IV Pre-Cambrian shields, with extensive acidic and limited basic-ultra basic intrusions.  
 V Cenozoic sediments  
 VI Mesozoic sediments  
 VII Paleozoic sediments

Undisturbed to moderately  
 Metamorphosed; no lavas  
 or intrusions.

### PROVINCES, FORMATIONS, AND ASSOCIATED MINERALS

Province Sub Province	Formation	Association	Known Deposits
<b>1. Eastern European Platform</b>			
A. Baltic Shield	Pre-Cambrian	Ultra basic Intrusion Acidic Intrusion	Cobalt, Nickel, Andalusite, Cerium and rare earths, Iron ore (Magnetite), Niobium and Tantalum, Phosphate (Apatite), Titanium
B. Azovo-Podolsk Shield	Pre-Cambrian	Metamorphic Acidic thru Basic Acidic Intrusion Hydrothermal Metamorphic	Quartz Crystals Zirconium China clay Graphite, Iron ore (hematite) Strontium, Radium Salts Coal, Iron ore (limonite) Bauxite, Borax, Bromine, Fire clay, Lignite, Gypsum, Magnesium Salts, Manganese, Petroleum, Potassium salts, Salt, Sulphur Fire clay, Phosphate rock, Petroleum
C. Central Russian Plain	Paleozoic (Devonian-Permian)	Hydrothermal Metamorphic Sedimentary	Lignite Fire clay, Salt Antimony, Mercury Coal Dolomite, Salt
D. Donets Basin	Mesozoic Cenozoic	Sedimentary Metamorphic Sedimentary	
E. Mangyshlyak Hills	Paleozoic (Carboniferous-Permian)	Hydrothermal Metamorphic Sedimentary	
<b>2. Alpine System</b>			
A. C. Asiatic Black Sea Lowland	Mesozoic	Sedimentary	Iron ore (limonite), Manganese, Petroleum, Potash, Salt, Vanadium
B. Caucasus Uplands (Cenozoic Diastrophism)	Pre Cambrian Mesozoic (Primarily Jurassic)	Hydrothermal Basic Intrusion Acidic Intrusion Hydrothermal Sedimentary	Cadmium, Lead, Zinc Cobalt, Iron ore (magnetite) Copper, Molybdenum Arsenic, Barite, Molybdenum, Tungsten Gypsum, Manganese, Salt
C. Kopet Dag Uplands (Cenozoic Diast.)	Pliocene-Cretaceous		
D. Pamir (Cenozoic Diast.)	Pre Cambrian Paleozoic	Acidic Intrusion Hydrothermal	Quartz Crystals Fluorspar
<b>3. Ural-Tianshan System</b>			
A. Urals (Lower and Upper Paleozoic Diast.)	Paleozoic (?Pre-Cambrian- Carboniferous)	Ultra Basic Intrusion Basic Intrusion Acidic thru Basic Acidic Intrusion Hydrothermal Metamorphic Sedimentary Hydrothermal Metamorphic	Asbestos, Chromite, Cobalt, Iron ore (titano-magnetite), Magnesite, Nickel, Platinum, Vanadium (titano-magnetite) Cobalt, Copper, Iron ore (magnetite), Pyrite, Zinc Quartz, Crystals, Vermiculite, Mica, Fale Arsenic, Barite, Beryllium, China clay, Corundum, Gold, Iron ore (mag- netite), Niobium, Quartz Crystals, Titanium, Zirconium Magnesite, Tungsten Coal, Graphite Bauxite, Lignite, Manganese, Salt Fluorspar Coal
B. Palkhoi-Novaya Zemlya System (Upper Pale., Diast.)	Paleozoic (Silurian-Permian)	Metamorphic Sedimentary Sedimentary	Coal, Iron ore (limonite) Bauxite, Fire clay, Lignite, Manganese Salt, Sodium salts
C. Western Siberian Lowland	Mesozoic (Jurassic- Cretaceous)	Metamorphic Sedimentary Metamorphic Sedimentary	Coal and lignite Barite, Bauxite, Gypsum, Petroleum, Salt, Sodium salts (Mirabilite), Strontium, Sulphur (native) Petroleum, Salt, Sodium salts, Sulphur Andalusite, Bismuth, Copper
D. Central Asiatic- Black Sea Lowland	Cenozoic Paleozoic (Incl. ? Pre Cambrian), Upper Paleozoic Diast.	Sedimentary Acidic Intrusions Hydrothermal Metamorphic	Antimony, Arsenic (?), Bismuth, Cadmium, Fluorspar, Lead, Mercury, Tungsten, Uranium (?), Zinc Phosphate rock, vanadium
E. Tianshan Ranges			
F. Kazakhstan Upland	Pre Cambrian Paleozoic (Largely Undifferentiated and Silurian) Lower and Upper Paleozoic Diastrophism	Basic Intrusions Acidic Intrusions Hydrothermal Unknown Sedimentary	Andalusite, Copper, Corundum, Molybdenum, Tungsten  Copper, Lead Barite, Iron ore, Manganese Bauxite



Province Sub Province	Formation	Association	Known Deposits
G. Karaganda Coal Basin	Paleozoic	Metamorphic Sedimentary	Coal Fire clay
J. Taimyr Peninsula	Pre Cambrian Paleozoic (Silurian and Permian) Upper Paleozoic Diast.	..... ..... .....	..... ..... .....
4. Central Siberian Platform			
A. C. Siberian Uplands	Pre Cambrian Paleozoic (Cambrian- Permian)	Metamorphic	(Coal)
B. Lena-Khatanga Trough	Paleozoic (Cambrian) Mesozoic (Jurassic- Cretaceous)	Sedimentary	(Lignite)
C. Lena-Yenisei	Paleozoic (Cambrian- Permian) Lower and Upper Paleozoic Diast.	Ultra basic Intrusion Basic Intrusion Acidic Intrusion Metamorphic Acidic Intrusion Sedimentary Ultra basic Intrusion	Cobalt, Copper, Nickel, Platinum Iron ore (Magnetite) China clay Graphite Gold, Mica, Thorium Lignite Asbestos
D. Yenisei Ridge	Pre Cambrian	Metamorphic	Coal, Gypsum, Salt
E. Chulymo-Yeniseisk Basin	Mesozoic (Jurassic)	Basic (Ultra basic?) Intrusion Acidic Intrusion	Arsenic, Cerium and Rare earths, Gold, Iron ore (magnetite), Mn, Tungsten, Uranium, Zirconium
F. Western Sayan Ranges	Paleozoic (Lower Paleozoic Diast.) Mesozoic (Jurassic)	Hydrothermal Metamorphic Metamorphic Sedimentary Metamorphic	Lead, Molybdenum Andalusite, Corundum Coal Sodium salts, (mirabilite) Coal
G. Chersmkhovo (Irkutsk) Basin	Pre Cambrian (Lower Paleozoic Diast.)		
H. Eastern Sayan-Aldan System			
I. Minusinsk Coal Basin	Mesozoic (Jurassic) Cenozoic (lacustrine) Paleozoic (Permian)		
6. Khingan-Verkhoyansk System			
A. Verkhoyansk-Chukchi Ranges (Mesozoic Diastrophism)	Paleozoic Silurian-Devonian Mesozoic (largely Triassic) Mesozoic	Acidic Intrusion	Fluorspar, Gold, Lead, Tin, Tungsten
B. Okhotsk Lava Beds	Undist. Paleozoic to Juras- sic (Mesozoic Diast.)	Acidic Intrusion	Beryllium Bismuth, Borax (quartz-tourmalines), Fluorspar, Gold, Tin, Tungsten
C. Transbaikai Plateau		Hydrothermal Unknown Acidic Intrusion Acidic Intrusion Metamorphic	Cadmium, Lead, Zinc Antimony, Graphite Gold, Zirconium (?) Tin Coal, Lignite
D. Bureya Uplands (Mesozoic Diast.)	Pre Cambrian Paleozoic Mesozoic (Jurassic)	Acidic Intrusion Hydrothermal Metamorphic Sedimentary	Bismuth, Cadmium, Lead, Zinc Tin Coal, Lignite Iron ore (limonite)
E. Sikhote Alin (Mesozoic Diast.)	Paleozoic Mesozoic		
6. Eastern Asiatic System (Cenozoic Diast.)			
A. Sakhalin Island	Paleozoic Mesozoic Cenozoic (Upper) Paleozoic-Cenozoic	Metamorphic Sedimentary	Coal Petroleum
B. Kamchatka-Koryak Ranges			

Sources: Primarily, Arkhangelski (1941), Motylev (1937, Map, 96-97), Suslov (1947, Part II, Map 7), Fersman (1940), Fedorov (1939), Gorskii et al (1944), Zakharov (1938), Kassin (1938); and sources cited in reviews of individual minerals.

Soviet achievements in mining, though impressive, have nevertheless failed to equal the country's plans. The output reached in 1932, at the end of the First-Five-Year Plan, was but three-quarters of the goal (if both are weighted at U. S. 1937 dollars). Only the production of fuels surpassed or approached the goals set; the contrasting failures in non-ferrous metals and fertilizer basics were especially severe. The Second Five-Year Plan again fell a quarter short of the goals set. In general, ferrous metals and coal production approached their goals; for some non-metallics, such as barite and potassium salts, the targets were exceeded substantially. On the other hand, the margins between expectation and achievement were especially great for non-ferrous metals, petroleum, and various non-metallics, e.g., asbestos and salt. In 1950, the Soviets, by-and-large, reached the goals of the Fourth Five-Year Plan; the one outstanding failure was in natural-gas production. At the same time, it should be noted that this Plan was not merely a repetition but in some instances an actual reduction of the goals set originally for 1942. By the earlier standard, the outputs of petroleum, fertilizers, and salt-chemicals were not yet satisfactory. We shall return to the relation between goals and actualities in

Soviet mineral production in the discussion of self-sufficiency.

### Changes in Regional Output

While the rise in total Soviet mineral output was more marked between 1926 and 1937 than between 1937 and 1950, the regional shifts in production were more extensive in the latter period (See Fig. 42). In 1926, 90 percent of the country's mineral production, excluding gold, came from the Ukraine, the North Caucasus and Transcaucasus, and the Urals. The first area produced three-quarters of all Soviet pig iron and coals, half its manganese, the bulk of its refractories and salt, and all its mercury. Practically all Soviet petroleum and natural gas flowed from Caucasian wells; other important products from those regions were manganese, cement, coal, base metals, and barite. The Urals were Russia's sole or primary source of asbestos, chromite, copper, magnetite, pyrite and talc. Also significant was their production of pig iron, gold, tungsten, miscellaneous refractories, and salt, but they were notably weak in mineral fuels and cement. Russia's major gold producing region in 1926 was Eastern Siberia.

In 1937, the shares of the Ukraine, the Transcaucasus and the Urals in Soviet mineral production were unchanged from 1926, but that of the North Caucasus had fallen from 13.6

percent to only 6.9 percent of the national total. The strengthening of the Urals fuel position with new petroleum, and expanded coal and lignite output; and the advent of nickel production in the Urals, aluminum in the Ukraine and north-west Russia, were, however, noteworthy. Also important was the emergence of lesser mineral-producing areas: western Siberia, with coal, pig iron, manganese, zinc and cement; Turkestan, with petroleum and coal, gold, lead, zinc, copper, chrome, tungsten, natural sulphur, cement and salt; and central Russia, with pig iron, cement, lignite for fuel and as a source of sulphur, fire clay, phosphate rock and gypsum. Eastern Siberia monopolized Soviet tin output, and was the major supplier of tungsten, but its previous supremacy in gold had been wrested away by the Far East, thanks to the discovery and ruthless exploitation of the great Kolyma placers in the latter region.

### Production Shifts Eastward

Information on the distribution of mineral output in 1950 is far less complete and reliable than for the pre-war years. Nevertheless, a basic eastward shift in mineral production since 1937 appears to be an unquestionable fact. Today, almost half of Russia's output of minerals comes from the Volga, Urals, Turkestan and Siberia, compared with little

more than a quarter in 1937 and 17 percent in 1926. Or, put in another way, the value of mineral production in the so-called eastern regions of the Soviet Union rose, at 1937 U. S. prices, from some \$36,-000,000 in 1926 to \$260,000,000 in 1937, and \$766,000,000 in 1950. These basic changes have resulted from a tripling in coal and lignite, a four-fold increase in petroleum and natural gas, a doubling in pig iron, the rise of aluminum production, and two-and-a-half-fold growths in copper and cement production in Russia's eastern regions. As a consequence of these changes, the eastern regions have not only become even more predominant in non-ferrous metals production than before World War II, but they have also eliminated their prior weaknesses in fuels and ferrous metals.

At the same time, the total output of the western regions has recovered from the war and then risen moderately, reflecting growths in coal and lignite, cement and pig iron production, and a new nickel industry in northwestern Russia, which have more than offset the decline of petroleum output in the Trans-

caucasus. Thus, the Ukraine in 1950 was once again Russia's primary mineral-producing area, surpassing the output of the Urals by nearly 30 percent. In the second rank were the Transcaucasus and two new areas, Turkestan, predominant in copper, lead, zinc, chromite, and sulphur, and important in fuels, phosphate rock, and salt; and western Siberia, surpassed only by the Ukraine in coal, only by the Ukraine and Urals in pig iron.

### Progress in Technology

A final aspect of the rapid increases in Soviet mineral production over the past twenty-five years has been considerable progress in mining and refining technology. In 1926, the technological problems of the Soviet Union were essentially simple, readily soluble by pre-World War I methods. In general, the use of good-grade, high-content ores, a fair margin of capacity, and a limited range of production characterized mining. A good deal of the product, especially in petroleum and manganese, was exported in crude form, while ferro-alloys and refined non-ferrous metals were largely im-

ported. Platinum-metals refining and fabricating, and pioneer geochemical and gravimetric investigations appeared to have been the sole areas of advanced technique at that time.<sup>1</sup> The geochemical researches, undertaken particularly by Fersman, led to important discoveries of rare metals in the Kola Peninsula and the Transbaikali; the gravimetric studies determined subterranean ridges and domes along the eastern margins of the eastern European platform, thus laying the foundations for later successful prospecting for petroleum and salines.<sup>2</sup>

During the 1930's, the technological problems of the Soviet mining industries changed radically. Vastly expanded production forced the use of less desirable ore-fractions, particularly high-sulphur Donets coking coals, and Krivoi Rog and Urals iron-ore fines. The new deposits under development were often characterized by low-grade and heavily contaminated ores, notably so for Kazakhstan porphyry copper, Urals coals and lignites, Western Siberian zinc-bearing iron ores, and Tikhvin and Kamensk bauxites. Insatiable economic and military demands required the tremendous overloading of capacities, e.g., blast furnaces and copper smelters. The production of new materials, such as antimony and tin, and the beginning of domestic ferro-alloy output presented unforeseen difficulties. So, too, did mastery of more advanced, imported equipment for flotation, petroleum-cracking, contact manufacture of sulphuric acid, and so on. The net result was extraordinary waste. Thus, in 1937, Soviet concentration and refining recoveries averaged 20 percent below foreign practice, with exceptionally poor performances in antimony, fluorspar, gold, graphite, petroleum and potash processing. Product standards were often poor: high-ash, high-sulphur coke, and water-logged china clay are illustrations. Finally, the inability to break technological bottlenecks at times inhibited production, e.g. asbestos, graphite, copper-by-product pyrite.

During and since World War II, many of these difficulties were overcome, in substantial part because of the great material and technical assistance provided by the United States and the British Commonwealth. True, overuse of equipment and inadequate maintenance led to partial breakdowns in base-metals and petroleum production. Yet greater experience and improvements in flow sheets, such as

Fig. 40  
Production of Selected Minerals in the U.S.S.R., 1926-1950

Mineral	Unit	1926	1928	1932	1937	1944	1950
<b>Ferrous Metals:</b>							
Pig iron <sup>1</sup>	Mill.m.t.	2 22	3 22	5 98	14 0	(8 0)	18 9
Chromite	Thous.m.t.	30 1	25 5	61 2	(225)	x	x
Manganese ore	Mill.m.t.	1 33	0 77	0 83	2 75	(1 2)	(3 0)
Nickel, primary	Thous.m.t.	—	—	—	2 0	10 9	(21)
Tungsten (60% WO <sub>3</sub> )	m.t.	54	(40)	117	(2000)	(4500)	(2000)
<b>Nonferrous Metals: (primary)</b>							
Aluminum	Thous.m.t.	—	—	0 9	37 7	82 7	(180)
Copper (electrolytic)	" "	17 4	22 0	38 1	90 8	(180)	(292)
Lead	" "	1 3	2 3	18 7	62 5	(50)	(144)
Mercury	m.t.	127	102 <sup>3</sup>	200 <sup>4</sup>	301 <sup>5</sup>	(100)	x
Tin	Thous.m.t.	—	—	—	(0 5)	(4 5)	(9 0)
Zinc	" "	1 9	2 2	13 7	65 0	(45)	(128)
Gold	Mill.oz.	0 89	0 90	1 99	5 36	x	x
<b>Fuels:</b>							
Coal	Mill.m.t.	23 5	32 4	57 5	109 7	(95)	(200)
Lignite	" "	2 3	3 0	6 9	17 6	(40)	(63)
Natural Gas	m <sup>3</sup>	228	270	905	1980	(1000)	2600
Petroleum	m.t.	8 34	11 4	21 6	28 5	(19 0)	35 0
<b>Other Nonmetallies:</b>							
Asbestos	Thous.m.t.	24 4	26 4 <sup>3</sup>	60 2 <sup>3</sup>	86 1	(35)	(157)
Barite	" "	14 4	x	x	70 0	x	x
Cement	Mill.m.t.	1 33	1 90	3 47	5 45	(1 7)	10 6
China clay	Thous."	182	x	x	203	x	x
Dolomite	" "	179	x	x	(1000)	x	x
Fire clay	" "	749	x	x	(2500)	x	x
Gypsum (calc.)	" "	292	241	475	1212	(330)	(2000)
Magnesite	" "	103	x	x	846	x	x
Phosphate rock <sup>6</sup>	" "	79 2	104 4	841	1948	(400)	(2500)
Super-phosphates (18 5% P <sub>2</sub> O <sub>5</sub> )	" "	61 2	113	468	1454	(300)	2600
Potassium salts (22% KCl)	" "	—	—	78 5	2318	x	(2000) <sup>7</sup>
Pyrite <sup>8</sup>	" "	105	192	371	1113	(800)	(1700)
H <sub>2</sub> SO <sub>4</sub> (100%)	" "	169	219	(600)	(1500)	(1100)	(2200)
Salt	Mill."	1 64	2 3	2 6	3 2	(2 0)	(3 9)
Soda ash	Thous."	136	215	(300)	532 <sup>7</sup>	x	(650)
Sulphur, nat.	" "	—	—	(19)	(80)	(85)	(100)
Talc and steatite	" "	3 0	x	x	25 6	x	x
<b>Value of Mineral Production:<sup>9</sup></b>							
Total	Mill. 1937 U. S. Dollars	239	309	582	1148	x	x
Excl. Gold	ibid.	208	278	512	960	711	1567

Sources: Corresponding Sections in Review of Minerals, except as noted.

Notes: <sup>1</sup> Excluding ferro-alloys (about 4% of total); <sup>2</sup> After Meisner 1939, p. 231; <sup>3</sup> After Meisner (1939, p. 326); <sup>4</sup> Including apatite concentrate; <sup>5</sup> However, better recoveries permitted an increase in potassium fertilizer output from 402,000 m.t. in 1937 to 850,000 m.t. in 1950; <sup>6</sup> Including coal brasses, but excluding smelter-gas recoveries; <sup>7</sup> For 1938; <sup>8</sup> Gross values of mining figures, other than gold, interpolated proportionately for 1928-32; for 1944 and 1950, value changes in the mining figures were assumed to be proportional to those of related known and estimated minerals. Totals exclude potassium salts, sulphuric acid, and soda ash.

Estimated figures are in parentheses.

— No output.

x Output figures lacking.

**Fig. 42**  
**Mineral Production by 1946 Economic Regions<sup>1</sup>, for 1926, 1937 and 1950**

Year	Group <sup>2</sup>	North-western	Northern	Baltic	Central	Urals	Ukrainian	Volga	North Caucasus	Trans-caucasus	Turkestan	West Siberia	East Siberia	Far East	Total
1926	Ferrous metals	—	—	—	0.9	11.1	38.6	—	—	5.1	—	—	0.6	—	56.3
	Nonferrous metals	—	—	—	—	4.2	0.3	—	0.3	0.5	—	—	—	—	5.4
	Fuels	—	—	—	0.8	2.3	36.6	—	24.3	47.9	3.2	3.6	1.3	1.3	121.3
	Non-metallies	1.2	—	—	3.2	3.7	7.9	3.6	3.7	0.5	0.5	0.4	0	0.1	24.8
	TOTAL	1.2	—	—	4.9	21.3	83.4	3.6	28.3	54.0	3.8	4.0	1.9	1.4	207.8
	Gold	—	—	—	—	3.1	—	—	—	—	1.5	0.3	22.2	4.0	31.1
1937	Ferrous metals	—	—	—	14.3	58.2	205.6	—	—	(7.0)	(1.5)	29.6	(3.9)	—	320.1
	Nonferrous metals	5.0	—	—	—	21.9	12.4	—	2.5	1.5	12.3	1.2	(0.6)	2.1	59.5
	Fuels	1.4	1.6	—	5.1	20.2	140.9	—	54.6	185.0	20.9	36.4	8.0	10.2	484.3
	Non-metallies	7.2	—	—	14.1	18.6	29.7	7.8	9.1	2.9	3.0	2.3	0.3	1.4	96.4
	TOTAL	13.6	1.6	—	33.5	118.9	388.6	7.8	66.2	196.4	37.7	69.5	12.6	13.7	960.3
	Gold	—	—	—	—	(10.0)	—	—	—	—	(7.0)	(0.6)	(80.0)	(90.0)	187.6
1950 <sup>3</sup>	Ferrous metals	9.0	—	—	23.2	144.1	207.4	—	0.6	7.2	5.9	35.7	4.0	0.9	438.0
(Approx. Non-ferrous metals)	7.9	—	—	—	—	86.5	10.4	—	4.6	8.9	63.4	6.5	5.9	7.9	202.0
Fuels	5.2	24.3	—	—	20.6	76.9	179.5	36.1	53.2	142.4	86.0	98.4	16.6	25.4	764.6
Non-metallies	8.5	—	7.0	—	20.0	36.2	44.4	16.3	11.0	6.0	6.7	3.7	0.5	2.5	162.8
TOTAL	30.6	24.3	7.0	—	63.8	343.7	441.7	52.4	69.4	164.5	162.0	144.3	27.0	36.7	1567.4

Sources: Corresponding Sections in Review of Minerals. Also, for 1926, Geological Committee, (1927) TsUNKhU (1932); for 1937, State Planning Commission (1939a) and Balzak, Vasyutin and Feigin (1949); for 1950, Anonymous (1950). Balzain (1959), *Zakon o Pyatiletom Plane* (1946). Bardin and Bannyi (1947) adjustments from the Third Five Year Plan, and detailed estimates based on resource and capacity data.

Notes: <sup>1</sup> Coverage as given in Figure 40. <sup>2</sup> For boundaries and definitions see Figs. 6b and 7. <sup>3</sup> Data for 1950 are approximate, possibly + 10 for the regional totals.

the wider use of coal-washing and iron-ore agglomerating units, have raised recoveries (which averaged 10 to 15 percent below U. S. practice in 1947), and standards, notably for antimony, asbestos and graphite. The recoveries of by-products, especially cobalt and molybdenum, and the use of very low-grade ores, e.g. tin, are now moderately successful.<sup>3</sup> A contributing factor in this regard has been the establishment of a central rare-metals refining plant at Chelyabinsk, modelled on an American prototype. The degree to which the Soviets are using advanced American and German methods, notably heavy media separation, is uncertain, although the fact of their experimental use in 1946-47 appears clear.<sup>4</sup> Above all, important results have been gained in rehabilitating war-damaged mines.

Nevertheless, the Soviet Union today still lags appreciably in mining and refining technology. Primitive techniques, as in sodium sulphate mining, and primitive equipment, such as venerable charcoal blast-furnaces are still evident. The use of low-grade andalusite and barite resources has not yet been solved. Nor have the problems of sulphur contamination in coking coal and petroleum, zinc contamination in iron ore, yet come under control. Low purities characterize much of Soviet metal production, for example, beryllium, cobalt and nickel ingots.<sup>5</sup> Refractory life is still short.<sup>6</sup> The range of ferro-alloys in standard production is both limited and conventional.<sup>8</sup> As mentioned earlier, geochemical and gravimetric prospecting methods are advanced, but electro-magnetic methods and experimental seismology appear yet to be immature.<sup>9</sup>

### FOREIGN TRADE

Information on Soviet foreign trade in minerals is relatively good for 1926-37 and 1941-44, but data on the later prewar, and postwar, periods are fragmentary and unreliable.

Before World War II, Russia's greatest foreign supplies of minerals were the United Kingdom, the United States, and Germany for non-ferrous metals and ferro-alloys; and Germany, Czechoslovakia and Poland for iron and steel, huge imports of which were essential to Soviet industrial construction in the early 1930's. In general, Soviet mineral imports were restricted to these few commodities. But they increased five-fold in volume (in constant prices) between 1926 and 1937. At the same time, a growing proportion of these imports, about a third in 1937, was for strategic stockpiling rather than current consumption. Such stockpiling, embracing tin, nickel, tungsten, molybdenum, and lead, primarily, proved of great service to the Soviet Union in 1939 through 1941, years when its pact with the Nazis had cut off Western supplies, and when the economic strains of frantic armament and the Finnish war were most severe.

After the German attack, in 1941, the aid sent by the United States, Canada, and the United Kingdom was indispensable to Russia's survival. For example, even in 1944, when Soviet recovery from the early disasters of the war had become appreciable, Lend Lease provided nearly a quarter of Russia's visible mineral supplies. During the entire war period, most of the Soviet supply of aluminum, cadmium, copper, diamonds, mercury, molybdenum, ferrovanadium and zinc came from the West. Abrasives, bromine, cobalt, graphite and carbon products,

iron and steel, lead, nickel, aviation gasoline and tin (in the forms of tin plate and bronze) were also shipped in very sizeable quantities. Deficiencies in Soviet processing capacity even forced imports of such normal surpluses as asbestos, ferro-chrome and ferro-manganese. Furthermore, *Lend Lease was used, toward the end of the war, to rebuild stockpiles to prewar peaks or higher.* Stockpiled commodities appear to have included cadmium, copper, diamonds, molybdenum, nickel, tin, tungsten (largely from China), ferrovanadium, and zinc. Also, the large amounts of mineral-processing, particularly petroleum-cracking, equipment sent should not be forgotten.

Since the war, Soviet mineral imports appear to have resumed approximately the 1937 level. In contrast to prewar years, however, the largest part of these imports, value-wise, has consisted of petroleum from Rumania and Austria, and coal from Poland. Other imports from Poland and Eastern Germany probably include uranium, zinc, cadmium, lead, and arsenic, as well as barite, bromine, fluorspar and potash. Hungary is an important supplier of bauxite to the Soviet Union; Finland, of copper. Probable imports from Manchuria and North Korea include pig iron, tungsten, molybdenum, talc, lead and zinc; from southern China, tungsten, tin and antimony. Copper, diamonds, tin and pyrite are known to have come from Western sources.

NOTES: <sup>1</sup> See Geological Committee (1927, pp. 523-558); Betehtin (1935). <sup>2</sup> See Fersman (1940); Molodenski and Fedynskii (1947); Arkhangel'skii (1941, pp. 50-104, based partly magnetometric data). <sup>3</sup> See Bibikova (1946); Titkov (1946). <sup>4</sup> See Mitrofanov, (1946, 1947); Bochar (1946). <sup>5</sup> Notarev (1948). <sup>6</sup> Marienbach (1947). <sup>7</sup> Budnikov and Zeitlin (1946); Polakowski (1951). <sup>8</sup> Agatov et al (1947); Shimkin (1950). <sup>9</sup> Cf. references in Gamburtsev (1947), Tikhonov and Zaborovskii (1947).

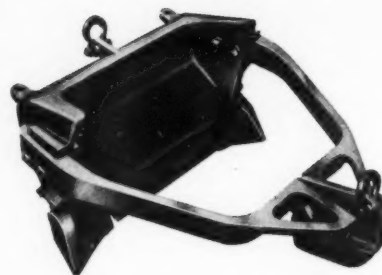


# NEW PACIFIC CATALOG

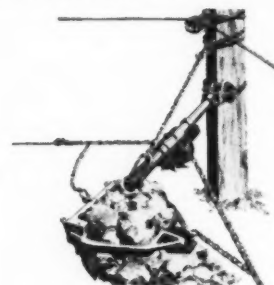


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# PLACER OPERATIONS

**From New Guinea to Colombia, South America**

**C. A. Banks Directs Gold Dredging Companies**

One of the world's largest gold dredging operations, Pato Consolidated Gold Dredging, Ltd., is currently working six mammoth dredges along the Nechi river and its tributaries in the municipalities of Zaragoza and Anori, department of Antioquia, Colombia, South America. During a recent eight month period Pato dredges recovered gold worth \$3,300,000.

## World Wide Placer Operations

Pato is an extensive project, but it is only one of several being operated by C. A. Banks, of Vancouver, B.C., and associates in various parts of the world, and it is not nearly so famous as its affiliated Bulolo Gold Dredging, Ltd., in New Guinea whose richness laid the foundations for the company. Bulolo has operated as many as eight dredges at one time, but its fleet this season is reduced to five or six. During the year ended May 31, 1951, Bulolo had six dredges working, handling 12,321,000 cubic yards of gravel from which \$2,388,015 was recovered. Its gravel reserves are estimated to be over \$20,000,000.

In addition to Pato and Bulolo, the organization operates Asnazu Gold Dredging, Ltd., with two dredges in Colombia. Nechi Consolidated Dredging, Ltd., operating

dredges downstream from the Pato property; Rutherglen Gold Dumps, Ltd. and Gold Dumps Proprietary, Ltd., in Australia; American Placers, Inc. in the United States and Canadian Exploration in Canada.

American Placers, in addition to its mine holdings in Southern California, owns Coronet Oil Company, with several gas and oil wells in Texas.

Driving force behind this enterprise from its inception has been C. A. Banks, who has been honored by his fellow Canadians by his appointment as lieutenant-governor of British Columbia. He is the third mining man to hold that office in the Canadian west coast province, the others being the late James Dunsmuir, whose family created Western Canada's greatest individual fortune from Vancouver Island coal, and the late Randolph Bruce, one of the developers of the Paradise and other gold mines in the Columbia valley in British Columbia.

## Career Started in Canada

For all his success in distant countries, Banks' early career in mining in British Columbia was singularly unrewarding and it gave little promise of what was to come in later years. He came to Canada as a young man two years before the outbreak



Charles Arthur Banks, managing director of Bulolo Gold Dredging, Ltd., Pato Consolidated Gold Dredging, Ltd. and associated gold dredging companies.

of World War I as a mining engineer eager to make his mark in British Columbia where there had been a succession of gold mining booms. He had several jobs and performed them competently, but the companies with which he was associated met with indifferent success. Soon after the war began he joined the Royal Engineers and went to France as a tunneling officer. After the war he returned to Canada and reestablished himself in the mining field, representing companies financed in part by British capital and interested in the Portland Canal area in northwest British Columbia, where the fantastically rich Premier mine was entering upon its wonderful career as a dividend payer for the Guggenheims and other interests.

But not until the middle 1920's did he strike it rich, and that was in a quarter far removed from Canada. He was a New Zealander by birth, a descendant of Sir Joseph Banks, a former president of the Royal Society who in 1768 financed and sailed with Captain Cook on his voyage of discovery to the South Seas. Most of his family associations were in Australasia. One of his friends was William Addison Freeman, who shared an interest in mining and a fascination with problems of engineering.

## Bulolo a Challenging Problem

In Bulolo there was a problem that appealed to them. Bulolo is the name of a river in the Mandated Territory of New Guinea, and from its headwaters in the high plateau had come stories of fabulously rich

Guayabal No. 6 dredge of the Pato Consolidated Gold Dredging, Ltd., is operating on the Porco River in Colombia, South America. It is a two cubic yard diesel-electric dredge operating under very difficult and dangerous dredging conditions due to terrific floods, swift current and steep rocky banks.





Hydraulic mining operations near Pato, Colombia.

placer ground. Prospectors brought amazing stories to Australia, but mining men had shrugged them off with the conviction that Bulolo was, for all its wealth, totally inaccessible. There were two major deterrents to mining there. One was the fact that the plateau in which the gold lay was high in the hills surrounded on all sides by impenetrable jungle; there was no way of reaching the country overland. Another drawback was the fact that the jungles swarmed with headhunting cannibals who were singularly uncooperative with mining men or any other intruders.

But the gold was there, and that was the dominating fact that stirred the imagination and the ingenuity of Freeman and Banks. The problem was how to reach it in a way that would bypass the jungle and the savages. Today, such a situation might not have been so baffling because of the advances made in commercial aviation. But a quarter of a century ago, aviation was an adventure in itself, even eliminating the added hazards to be encountered in the Bulolo country.

However, the Banks-Freeman partnership decided it was worth the risk. They consulted with aviation experts and, having determined on a program, acquired a single-engined Junkers plane with which they made the first flight into the gold country. Test sampling of the ground confirmed the prospectors' stories, and Bulolo Gold Dredging, Ltd., was organized. Two more Junkers transport planes were put into service and a start was made in getting supplies and equipment into the area that had previously been written off as hopeless. The gold was in placers, and to recover it economically would require dredges. That fact in itself might have balked many a daring operator, because in those days carrying such bulky freight as would be represented by dredge machinery

was almost unthinkable. To Banks and Freeman, however, it was merely one of the imperative parts of the overall job. During the early days of the Bulolo development, the planes, carrying 3½-ton loads, managed to transport 45,000 tons of machinery from the coast of New Guinea to the golden plateau. A modern mining community was created and much to the surprise of everyone there was virtually no trouble with the headhunters. Eventually, the natives were convinced that the "crazy white men" had no sinister designs against them and they were quickly won over. More than a thousand ex-cannibals were given employment in the gold mines.

#### A Success From the Start

The planes that carried in equipment and supplies came out with gold bullion in quantities that astonished Australians. The news of the great success quickly spread throughout the mining world. Bu-

lolo was a financial success from its inception. During the period that ended in 1942 more than \$45,000,000 in gold was taken from Bulolo. In 1942, operations were abruptly halted by Japanese invasion, but the Japanese found only a dismantled plant and all the employees and managers gone by the time they reached the placer ground. They never attempted to carry on dredging there, and while some of the plant was demolished, it was not long after peace was restored that Bulolo resumed its activity.

#### World Wide Success

But long before that, Mr. Banks and his instinct for the calculated risk had moved into other fields, while retaining control of Bulolo. In fact, Bulolo was merely a stepping stone to success in other lands—South America, Australia, the United States and other countries where placer ground was available in sufficient area to warrant long-term dredging.

The Banks' companies have always been primarily interested in placer mining, although in recent years they have gone in for other types of operation in line with a policy of diversification. They have even struck oil in Texas, but that is another story. Generally speaking, their properties are not underground mines necessitating a lot of tunnels and shafts. Mr. Banks and his friends prefer to stay on the surface, partly because this technique has richly rewarded them and because their experience at Bulolo and elsewhere has made them specialists as placer gold producers.

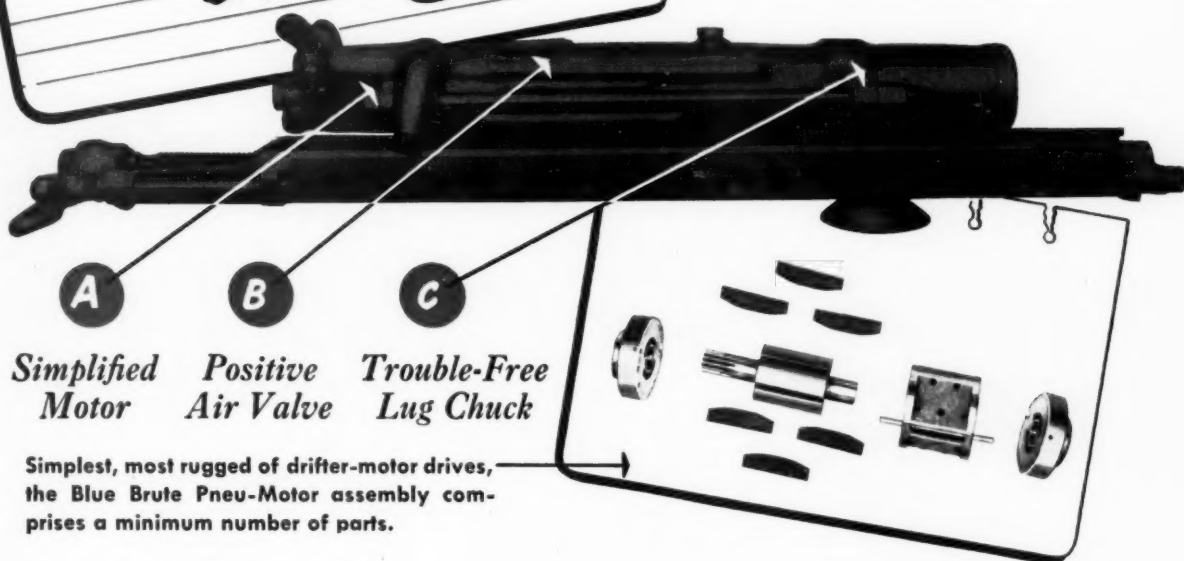
Top: Pato Consolidated Jobo No. 3 dredge operating along the rim of Jobo lake. Bottom: San Francisco No. 4 dredge of Pato Consolidated operating in the Nechi River near Pato, Colombia. This 13½ cubic foot dredge is digging 68 feet below water level.





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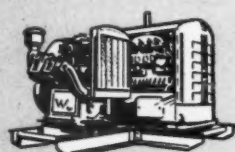
**(C) Lug Chuck** . . . In Blue Brute Drifters the one-piece chuck sleeve reduces friction, holds alignment better, allows the piston to hit cleaner and harder. Worth considering when you remember that the chuck area is a major trouble-spot in ordinary drifter design.

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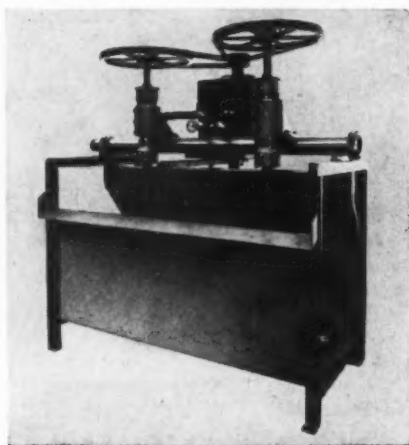
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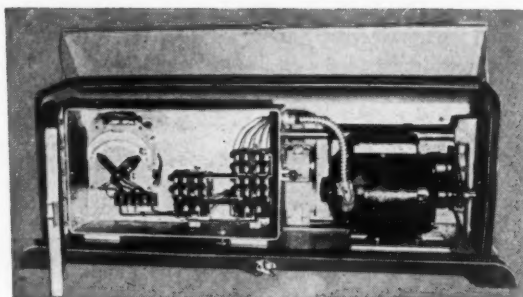
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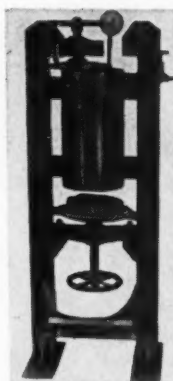
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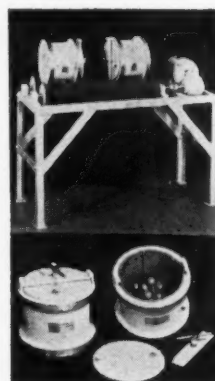
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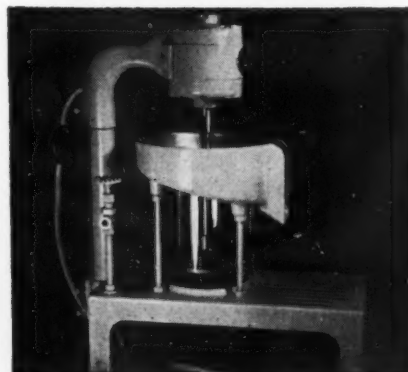
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## ACTIVITIES OF INTERNATIONAL MINING MEN

**Gordon S. de Villiers**, underground manager for the Anglo-Transvaal Consolidated Investment Company, Ltd., Johannesburg, South Africa, is in the United States temporarily acting as consultant to the E. J. Longyear Company, Minneapolis, Minnesota. He was in charge of the Virginia No. 3 Shaft in the Orange Free State, which in two successive months this year broke the world's record for shaft sinking (See *Mining World* for June and August—504 feet of sinking and concreting during the month of April, 1951.)

**DR. W. C. SCHROEDER** has been appointed assistant director of the Bureau of Mines, U. S. Department of the Interior, Washington, D.C., and acting administrator of the Defense Minerals Administration, replacing in the latter instance Dr. James Boyd. Schroeder graduated from the University of Michigan in 1930, obtained his Doctor's degree there in 1933 and immediately joined the Bureau of Mines. From 1945 on, he had been chief of the Synthetic Liquid Fuels Branch. He is a member of the American Chemical Society, the American Society of Mechanical Engineers, the American Institute of Chemical Engineers, and the American Petroleum Institute.



**W. J. Terry** was elected president for the year 1951-52 at the recent annual meeting of the British Non-Ferrous Metals Federation in London. **H. E. Jackson**, **H. C. Gibbins** and **W. F. Brazener** were elected vice presidents.

The Honorable **Lewis W. Douglas** and **I. C. Raymond Atkin** have been elected directors of the International Nickel Company of Canada, Ltd., according to an announcement from New York by **Dr. John F. Thompson**, chairman and president. Mr. Douglas, former American Ambassador to the Court of St. James, is a member of the well-known Arizona mining family. He has done mining himself in Arizona, has been a Congressman, director of the Budget, vice president and a director of the American Cyanamid Company, principal and vice chancellor of McGill University, Montreal, and president and chairman of the Mutual Life Insurance Company of New York. Mr. Atkin is a vice president, director and member of the executive committee of J. P. Morgan & Company, Inc., a director of the Canada Life Assurance Company and chairman of the foreign exchange committee of the New York Money Market.

**Henry Krumb**, international mining engineer and consultant, and graduate of Columbia University's School of Mines in 1898, has been awarded an honorary degree of Doctor of Science by Columbia.

**Bertil Starck**, chief engineer at the Svenska Metallverken, is in the United

States in order to assist the Swedish Embassy in Washington in questions referring to copper at the talks held by the International Minerals Conferences.

**Dr. Zay Jeffries** of London has been appointed director general of the World Metallurgical Congress. The Congress will meet at Detroit, Michigan, from October 14 to 19.

**F. L. Stillwell** has been awarded the Clarke Memorial Medal of the Royal Society of New South Wales, Australia, for 1951, for meritorious research in geology.

**Dr. Roland R. Renne**, president of Montana State College, has been appointed chief of the Economic Cooperation Administration's Special Technical and Economic Mission to the Philippines, according to reports from Washington, D. C.

**K. Nagaraja Rao**, Indian Chemical engineer, has been selected by the Economic Cooperation Administration to set up a program of small-scale industry in Indonesia. ECA and Indonesia are co-sponsoring the project.

**Arnold H. Miller**, consulting engineer of New York, has been appointed by the Government of Chile to work on the plans for the new electrolytic copper refinery there.

**Arne Drogseth** has been appointed managing director of the Norwegian Government mining company, A/S Statens Bergverk. He had been State Counsellor to the Ministry of Industry in Norway.

**Dr. John Convey** is to be made director of the Mines Branch of the Canadian Department of Mines and Technical Surveys. He has been chief of the Physical Metallurgy Division and will succeed **C. Stewart Parson**, retiring, in the new job.

**Marvin J. Udy**, consultant particularly in the field of electric-furnace smelting, has returned to New York from Stibnite, Idaho, where he worked with the Bradley Mining Company on electric-furnace smelting of antimony, on possible new uses for antimony and its price stabilization.

**Charles R. Hubbard**, mining engineer, has left Healdsburg, California, U.S.A., to become mine superintendent for the Compagnie Caledonienne des Metaux, S.A., at Noumea, New Caledonia.

**Max Goldick**, concentrator superintendent for Roan Antelope Copper Company in Northern Rhodesia, is visiting mining operations in the United States and studying the latest technical developments.

**F. A. Anderson**, previously mine superintendent, has been appointed general superintendent of mines of the Zinc Corporation Ltd., and New Broken Hill Consolidated Ltd., Broken Hill, New South Wales, Australia.

**T. A. McDonough**, chief engineer of Wright-Hargreaves Mines Ltd., Kirkland Lake, Ontario, Canada, was recently appointed to a three-year term on the Provincial School of Mines advisory committee, Haileybury.

**J. E. Manners**, general manager of Boulder Perseverance Ltd., Kalgoorlie,

Western Australia, is in England on a four-month trip. Other travelling Australians include **Keith Hodgson**, senior metallurgist of O. T. Lempriere and Company, Ltd., Alexandria, New South Wales, who is on a business trip to Malaya, the United Kingdom, Europe and the United States; and **R. C. Buckett**, who has just returned to Fimiston, Western Australia, after six months in South Africa and Rhodesia.

**E. G. Crayston** of Madsen Red Lake Gold Mines Ltd., Madsen, Ontario, Canada, has been appointed general manager of the company.

**J. Bryden**, **J. H. Salter** and **Dr. B. P. Sutherland** have been appointed administrative assistants to assist **R. W. Diamond**, vice president and general manager of The Consolidated Mining and Smelting Company of Canada Limited, Trail, British Columbia, Canada. **E. Benson** has succeeded Salter as assistant manager of the personal division; and **J. R. Mills** has succeeded Dr. Sutherland as chairman of the research board. All of the men have been employees of COMINCO for some years.

**W. J. O'Dea** and **Peter Dunlop** have joined the staff of the Anglo-Westralian Mining Pty. Ltd., at Big Bell, Western Australia, Dunlop as senior geologist.

**T. H. Weldon**, formerly assistant superintendent of the zinc plant of Consolidated Mining and Smelting Company of Canada, Ltd., Trail, British Columbia, is now superintendent.

**M. A. Moore** has resigned from the position of manager for Associated Minerals Pty. Ltd., Southport, Queensland, Australia, and has been appointed works manager and engineer for Rutile Sands Pty. This company is carrying out operations on the coast approximately five miles north of the New South Wales-Queensland border.

**J. A. Mitchell**, formerly of Boulder, Western Australia, has been appointed manager of Northern Star Gold Mine Ltd. at Tennant Creek, Northern Territory.

**DR. I. M. LEBARRON** has been appointed director of research laboratories for International Minerals & Chemical Corporation and will maintain offices at Chicago, Illinois, and Mulberry, Florida. He had been a research engineer with International since 1942. He holds a B.S. degree in chemical engineering from Syracuse University, an M.Sc. degree from Rhode Island State and a Doctor-of-Engineering degree from the Colorado School of Mines. He is an inventor and co-inventor of various patents, author and co-author of scientific papers, and has been partially responsible for International's development of processes to treat manganese ores, fluorspar, and phosphate, among other projects.





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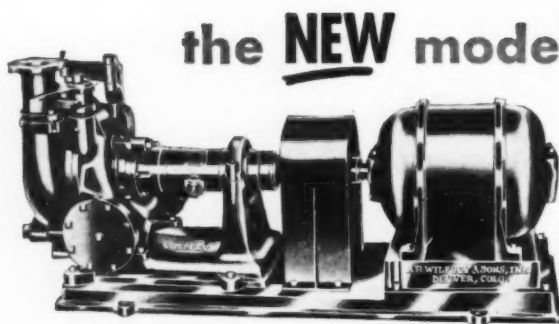
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## INTERNATIONAL NEWS

### NEWFOUNDLAND'S MINERAL WEALTH GRADUALLY BECOMING RECOGNIZED BY MINING FIRMS

Newfoundland is still a very unexplored and nearly virgin island as far as mining is concerned but slowly important ore discoveries are being made and more companies are becoming interested in their development. Prime Minister Joseph Smallwood has been trying to attract mining companies to move onto the island and spent a considerable sum last year to have Aeromagnetic Surveys do a very successful survey over 5,000 square miles.

One of the most important operators is Buchans Mining Company at Buchans, now 23 years old, which produces rich zinc-lead-copper ore, and in 1950 yielded profits of about \$6,000,000 to the Anglo-Newfoundland Development Company, owner of the mine, and the American Smelting and Refining Company, owner of the company. Production is running about 1,100 tons daily. Buchan controls the mineral rights within a 30-mile radius of the mine, has rights over 2,000 square miles of Anglo-Newfoundland charter land and holds concession rights on an adjoining 6,000 square miles. G. G. Thomas is general manager of the company.

Falconbridge Nickel Mines, Ltd., which has extensive operations in Ontario, shows signs of eventually becoming another important producer in Newfoundland. On the north coast along Notre Dame Bay, Falconbridge has acquired the Gull Pond, Rambler and Tilt Cove properties and a concession on an adjoining 2,000 square miles, which were covered by the government's survey last year and on which \$150,000 at least must be spent in the three-year period ending in the middle of 1954. The company has a large exploration program under way now and has spent about \$250,000 to explore the area so far. The main property is Gull Pond, a promising copper prospect, which is being handled by a new subsidiary, Gullbridge Mines Ltd. Former operators developed Gull Pond somewhat and 2,160,000 tons of copper-bearing ore was estimated to be available. Another subsidiary, Rambridge Mines, Ltd., will handle the Rambler gold-copper-zinc prospect, 50 miles north of Gull Pond. The Rambler has been drilled by past operators who estimated 300,000 tons of ore available. The Tilt Cove property, 55 miles northeast of Gull Pond may be bought outright by Falconbridge. The mine was worked for copper as early as 1865 and is Newfoundland's most famous old copper property. About 1,500,000 tons of 1 percent copper ore are thought to exist here. G. M. Proudfoot is field superintendent of Newfoundland operations.

In Conception Bay and off Newfoundland's east coast is Bell Island where Dominion Wabana Ore, Ltd., the largest Newfoundland metal producer, plans to produce 1,700,000 gross tons of hard, lump

iron ore this year and 2,500,000 tons next year. A \$6,000,000 expansion and modernization program is in effect now at the 52-year-old property. Because of the silica and phosphorus content of the ore, which American steel men dislike, the company's markets are its parent company, Dominion Steel & Coal Corporation, Ltd., of Canada, the United Kingdom, which recently contracted for 1,120,000 tons annually for five years, and Europe, where 560,000 tons will be shipped to Germany yearly for five years. Ore reserves are estimated at from 2½ to 4 billion tons. Surface workings covered one sq. mile and are worked out; submarine workings are now three miles from the shore and embrace an area of almost two sq. mi. About 54,000,000 gross tons of ore have been mined since operations began.

Other companies include two which mine enough fluorspar at St. Lawrence to supply Canada's needs and to export a large surplus to the United States; the government-formed Newfoundland and Labrador Corporation with extensive holdings including those covered by the aero-magnetic survey—some preliminary exploration probably will be done by this firm which is also ready to grant concessions to any interested private companies; Pilley's Island Copper (1951), Ltd., which is exploring a copper-pyrite prospect on Pilley's Island; Independent Mining Corporation, which is preparing to dewater the old York Harbour copper mine at York Harbour; Mindus Corporation, which is exploring lead-zinc showings on the south coast by Bay d'Espoir; and various individuals, who are carrying on examinations of promising deposits of copper, lead, zinc, and other minerals throughout the island.

### Austrian Iron Ore Project Expanded

Production from one of Europe's principal iron ore deposits in Austria's Erzberg area is being expanded by Marshall Plan aid. Previous expansion had been planned to step up the production goal to 5,500 metric tons of ore daily. ECA now announces that the goal will be 7,400 tons per day. Total cost of equipment and mining installations will be approximately \$2,326,000.

### Rhodesia Gets ECA Funds For Rail Expansion

A general expansion of the railway facilities in Northern and Southern Rhodesia, Africa, will be assisted by funds from the United States' Economic Cooperation Administration. A loan of £5,000,000 has been appropriated to purchase rolling stock, locomotives, and other equipment needed to help in developing the natural resources of the two countries. Shipments of cobalt, tungsten, cop-

per, and chrome to the U.S. will help to repay the loan.

Further development of mineral resources may be effected by a gigantic hydroelectric power project which would provide a final capacity of 1,000 megawatts.

Recommended by the Inter-territorial Hydroelectric Power Commission, the project would involve the creation of a lake 200 miles long at Karika Gorge on the Zambesi River at a cost of £174,504,000. The commission estimates that, at an initial cost of £43,519,000, 385 megawatts could be available by 1961 for transmission to the copper fields.

### Turkish Mine Output Due to Expand in 1951

Worldwide demand and high prices offered for minerals are making the big and small mine operators in Turkey renew their efforts to increase their production and open up new mines. Recently, the Mining Department of the Ministry of Commerce has been kept very busy with much more than the usual applications for prospecting and operation permits.

So far no new mines or minerals of importance have been reported, and it is too early to predict how much of an increase in production will result due to the late activities in the mining field, however it is safe to say that mineral production of Turkey this year will be highest in its history.

On the other hand, meetings have been held in recent months in preparation for revisions of the existing mining laws, and revisions are expected to go before the National Assembly after the summer vacation.

Reorganization of the Mining Department of the Ministry of Commerce is also considered to simplify granting of mine prospecting and operation permits.

### Belgian Congo Will Map Large Tin Reserves

The Belgian Government has created the Reserve Minière du Lualaba, which consists of an area of 44,000 square kilometers in the Katanga region in which Geomines, Sermikat, Sogetain and Somika companies have been mining tin for some years, and in which reserves of tin are extremely large. Having delineated this area, the Government in cooperation with the Compagnie du Katanga set up the Katanga Special Committee for the purpose of making air maps and geological surveys of the reserve in order to make better concessions in the future. The companies already holding concessions, such as Geomines and the others above, will of course benefit greatly from having the government do the work rather than they themselves.

Geomines is mining the large underground deposit of tin ore found several years ago by the managing director, Mr. Barzin, at Manono and at Kitotolo in Central Katanga. An ECA grant which paid for considerable equipment at the

mine is hastening development and mining. The company also does open-pit mining.

## Spain Wins U.S. Aid For Mineral Output

New credits totaling \$5,600,000 have been granted to Spain under the United States' General Appropriation Act of 1951, according to reports from Washington, D.C. About \$3,200,000 of this will be for the increase of Spanish mineral production.

The iron ore mines of Cia. Espanola de Minas del Rif, S.A., in Spanish Morocco will receive credit up to \$200,000. (Shipments of iron ore from Rif mines to the U.S. during 1950 amounted to 50,000 tons.) The Rio Tinto Company, Ltd., producer of pyrite, sulphur, and copper in the Province of Huelva, Spain, will receive up to \$1,220,000 for machinery to increase production of these essential ores. About \$1,600,000 will be to increase the production of lead, while \$230,000 will be allocated for tungsten mining.



**PHILIPPINES**—Of four mines in the Marsman & Company group, which were

important producers of gold prior to the war, one has resumed operation and three others will be producing before the end of 1951, now that rehabilitation is nearing completion. *Coco Grove, Inc.*, in the Paracale District began operating in August. It once was the largest placer operation in the Philippines. Now the large bucket dredge has been rebuilt and a yearly output of 2,000,000 cubic yards is planned. *Itogon Mining Company* in the Baguio District will begin operating in September. The plant has been completely rebuilt and mill capacity is 10,000 tons monthly. Since drainage is by an adit, reopening of the workings has not been overly difficult. *San Mauricio Mining Company* and *United Paracale Mining Company* in the Paracale district should start milling during the fourth quarter. *San Mauricio's* new mill will have a daily capacity of 300 tons; mine workings are being unwatered. *United Paracale's* mill is being rehabilitated; its capacity will be 250 tons daily. Concentrate will be treated at the *San Mauricio* plant in order to separate gold from copper, lead and zinc. *United's* mine also is being unwatered. Money received through War-Damage payments and Philippine-Rehabilitation-Finance-Corporation loans has made the resumption of operations possible at these four Marsman properties.

**WESTERN AUSTRALIA**—The Moolyella tin mining field is being reopened by a new company which has taken over four dredging claims. The field is near

Marble Bar in the center of the state.

**NORTHERN TERRITORY**—*Imperial Gold Mines, Ltd.*, of Adelaide, South Australia, has taken an option over the *Pioneer* group of scheelite-wolfram leases near Hatches Creek in Northern Territory, and a new company, *Imperial Scheelite, N. L.*, will be founded to work the deposits.

**QUEENSLAND**—*Mt. Isa Mines, Ltd.*, is negotiating for the purchase of all the shares of the *Mining Trust, Ltd.*, a British company owning the *Britannia Lead Company*, at whose refinery is handled all of *Mt. Isa's* silver-lead bullion. *Mining Trust* also owns nearly £1,000,000 sterling of debentures in *Mt. Isa* and 18.8 percent of the capital of *New Guinea Goldfields, Ltd.*, and paid a 10 percent dividend this year. *Mt. Isa*, in the year ended June 1950 milled 531,810 tons of ore averaging 5.5 ounces silver, 7.5 percent lead and 7.2 percent zinc per ton for a production of 94,320 tons of lead concentrate and 41,743 tons of zinc concentrate. The company is now using sulphur dioxide treatment of flotation feed, and metal recovery has improved through the installation of a lead-middling regrind unit comprised of a Marcy ball mill and duplex Driessen cone-classifier. Ore reserves at *Mt. Isa* as of June 1950 amounted to 9,170,000 tons of silver-lead-zinc of which one-third is developed. Copper reserves are 2,952,000 tons. The scope of company operations is such that control over all the phases must appear attractive.

**WESTERN AUSTRALIA**—*Great Boulder Pty., Gold Mines, Ltd.*, reports finding an orebody assaying 5.9 dwts over 12 feet. The orebody is at the 3,100-foot level. The company earned a net profit of £A175,705 for the year ended December 31, 1950, having treated 360,733 long tons of ore for a recovery of 80,302 fine ounces of gold. A dividend of 50 percent has been declared.

**TASMANIA**—*King Island Scheelite (1947) Ltd.*, produced in one month 84.75 tons of wolfram valued at £A163,400. The output from *King Island* for the eight months to June 30, 1951 is worth almost £A1,000,000.

**INDONESIA**—The production of tin concentrate during June was reported to be 2,486 tons of fine tin produced by three companies: *Banka Tinwinning*, 1,618 tons; *Billiton Company* 637 tons; and *N. V. Singkep Tin Exploitatie Maatschappij* 231. Total figures for the six months through June for the three companies amounted to 15,297 tons.

**PHILIPPINES**—One item in the Economic Cooperation Administration's recent grant of \$3,080,000 to the Philippines for economic projects includes \$69,000 to buy from the U. S. or Japan laboratory equipment, technical journals, field equipment and a specially equipped survey jeep. These will be used to help in rehabilitating the school of mining at the University of the Philippines.

**NORTHERN TERRITORY**—*Australian Development N. L.* at Tennant Creek reports that the final total of gold recovered from 993 tons of ore crushed recently was 6,313 ounces valued at £A97,000.

**QUEENSLAND**—*Table Tin Dredging N. L.* states that values at its property on Return Creek, *Mt. Garnet*, are lower than anticipated and the estimated life

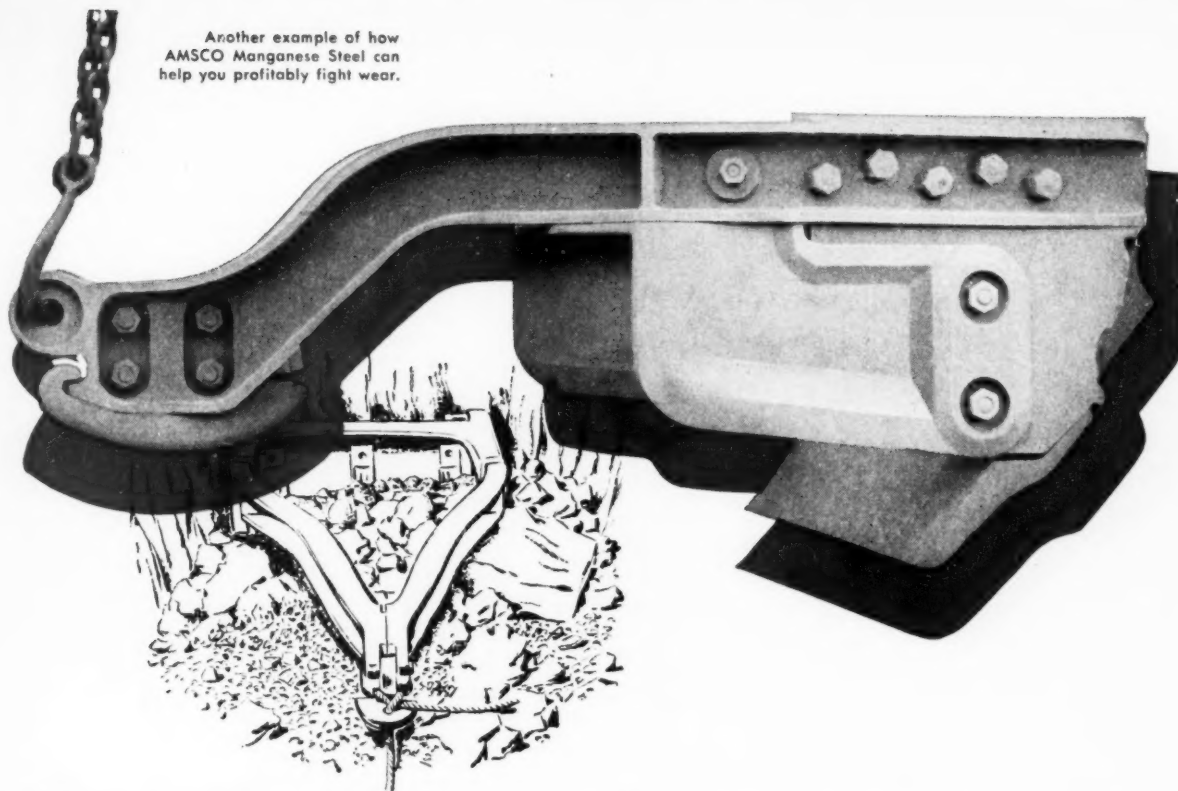


## BUREAU DRILLS AT NOBLE'S NOB

The Australian Bureau of Mineral Resources, Geology and Geophysics is conducting a complete geographical survey of the whole Australian continent, making a systematic search for new mineral deposits and for the means of better developing known deposits. The Bureau carries out about 90 percent of Australia's geophysical work and works closely with some of the major mining companies. The diamond drilling rig in the picture is at *Noble's Nob* gold mine, Tennant Creek, Northern Territory, where the Bureau is diamond drilling for ore shoots. The work is part of one of its geological survey programs.



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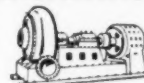
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SEPTEMBER, 1951

[World Mining Section—23]

49

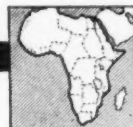
of the operation is only a year or so. However, the company has obtained leases at Smith's Creek, six miles from the present site, from *Alluvial Prospectors Ltd.* and expects to be able to dredge this land for 12 years.

**TASMANIA**—Low levels in Tasmania's hydro-electric supply dams have caused a 20 percent reduction in zinc output from *Electrolytic Zinc Company of Australasia Ltd.* at Risdon. Shipping shortages has restricted the supply of concentrates and calcine from the mainland. The plant normally produces 7,000 tons of zinc monthly. The power shortage and coke supply difficulties once again due to shipping, have restricted output from the *Mt. Lyell Mining and Railway Company Ltd.*'s refinery at Queenstown, on the west coast. About 4,000 tons of copper concentrate have been stockpiled.

As far as mining is concerned, Mt. Lyell's Euclid trucks and the new five-yard shovel are doing a good job in the West Lyell open cut. Ore is dumped by trucks and fed by Ross chain feeder to an 84 by 60 inch crusher, then via a 900-foot ore pass to rail trucks for delivery to the mill, which treats 4,100 tons a day, concentrating in Forrester machines from .67 percent to 23 percent copper. Tailing is reflowed for pyrite recovery. Production of blister copper by the company in the quarter ended March 31st was 1,329 tons.

**AUSTRALIA**—The payment of monthly bonuses from a tin pool to producers of the metal in Australia, has led to considerable attention by local investors to the shares of Aberfoyle Tin, at present Australia's leading producer of the metal. The payment recently caused the split

shares in the company to advance from 27/—(\$2.75) to 31/—(\$31.50). The price of tin to the mining companies is fixed by Prices Control at £A840 (£1781.60) a ton, after deducting smelting charges. The fixed price to consumers is £A1,450 (\$3248) a ton. So acute is the supply position that the bonus on production means a consequential higher price per ton for the mines. Aberfoyle is treating at a steady rate of over 2,000 tons monthly for a recovery of about 30 tons of tin concentrates and 10 tons of wolfram concentrates.



## AFRICA

**SOUTH AFRICA**—The *Blyvooruitzicht*, *West Driefontein*, *Western Reefs*, *Daggafontein* and *West Rand Consolidated* mining companies have passed resolutions to increase their borrowing powers by about £14,000,000, mainly for the purpose of erecting uranium producing plants. The arrangements for the loans will be made through the South African Atomic Energy Board; shareholders will not be asked to provide additional funds.

**TUNISIA**—Iron ore exports continue to increase and in the first quarter of 1951, 458,600 tons (compared with 362,000 tons in the same period of 1950) were shipped. About 45 percent of the ore went to England and about 21 percent to the United States. A general rise in production of minerals and metals also is evident in the first half of 1951 compared with the same period of 1950, i.e., superphosphate 104 percent, iron ore 23 percent, zinc 15 percent, lead 8 percent, and phosphate 1.7 percent. Exports of phosphate, however, rose 47 percent—1,017,500 tons have been shipped this year compared with 692,350 tons in the first half of 1950.

**SOUTH AFRICA**—Increases in exports and imports in the first five months of the year are substantial. Imports totaled £180,767,394 compared with £90,998,900 in the same period of 1950. Exports were £152,504,737 compared with £78,796,752. Semi-processed and processed gold exports were worth £29,130,107 compared with £7,021,331. Copper exports (bar and blister) were worth £2,590,522 compared with £1,743,675.

**EGYPT**—A Belgian mining group is in Egypt negotiating with the Government at Cairo for a concession to exploit iron ore deposits said to lie along the Suez Canal near the mouth of the Nile. The group also will visit Tripolitania to ascertain the importance of iron and phosphate deposits found in the Murzuk area.

**SOUTH AFRICA**—A new company, Witrand Mining and Finance, has acquired option contracts over extensive areas at both extremities of the Rand, namely Heidelberg and Krugersdorp. Old workings in the Krugersdorp area have payshoots assaying more than 240 inch-dwts., according to reports, with some ore as high as eight dwts. Occurrences of the Kimberley Reef between Heidelberg and Greylingstad are being investigated.

**ACTUAL PROVE GIVES ...**

**INSTALLATIONS MARCY MILL DESIGN**

SUMMARY	OVERLAY	BASE
	SECTION	SECTION
Grind	6.3" x 48H	5.5" x 48H
Mill Size	28" x 6"	28" x 6"
1/24 hrs.	6.6	9.3
		1/24 hrs

INSTALLATIONS		REMARKS	
SUMMARY	OPEN FLOW SECTION	GRATE SECTION	
Grind	6.3% x 48" / 55% x 48"		Slightly Finer Grind (Grates)
Mill Size	10.82" x 6" / 8.82" x 6"		Grates
Tons / 24 hrs.	6.6	9.34	1.55 KWH / Ton less 10%
KWH / Ton	2.06 / ton	1.67 / ton	Grates show less ball wear

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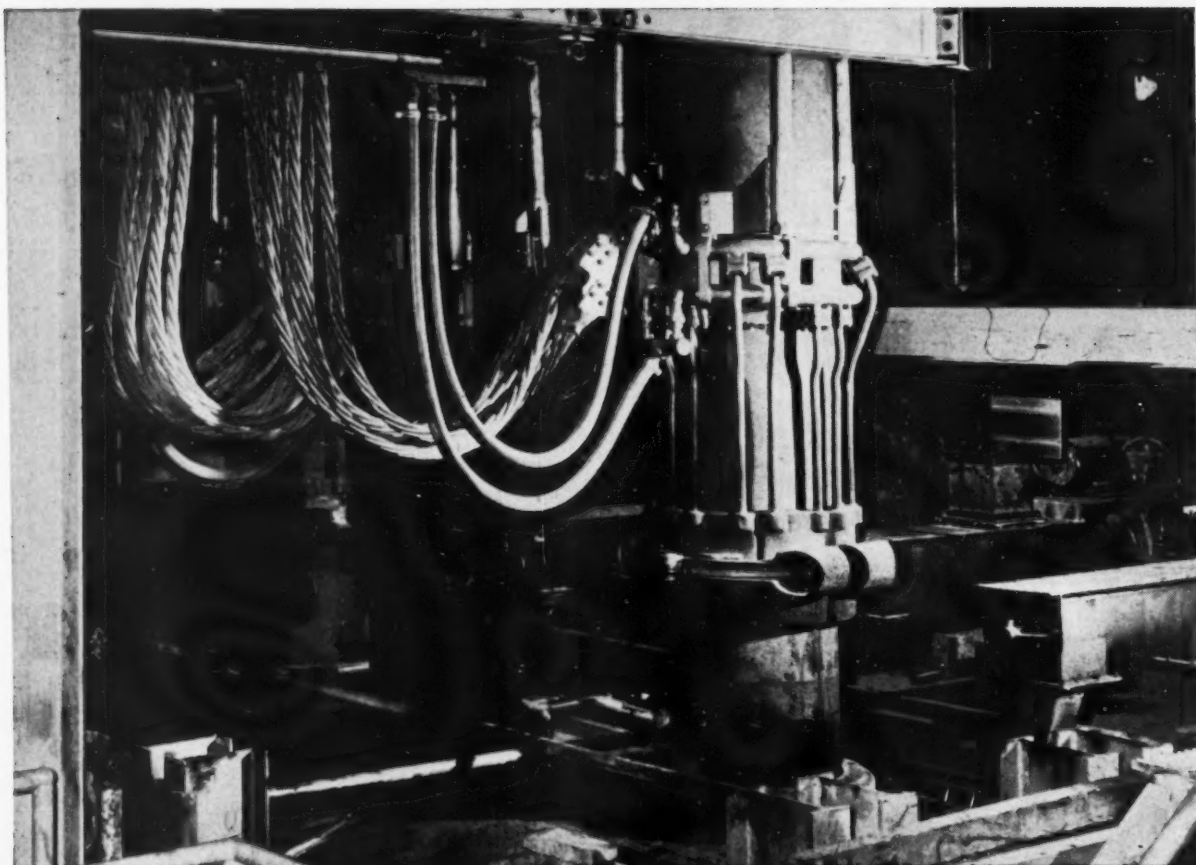
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## INTERNATIONAL

**SOUTH AFRICA**—Arrangements have been announced for bringing the Stilfontein gold mine in the Orange Free State to production with a capacity of 50,000 tons monthly by the second half of next year. In addition, money will be raised to finance the erection of the new uranium plant and for financing the Lucas Block which adjoins the southern boundary of the Stilfontein mine. About £2,500,000 will be required to bring the mine to production; a further £2,500,000 for the uranium plant; and each of the two companies which has been formed to mine the Lucas Block will have £1,500,000 loan facilities made available by the Anglo-American Corporation. Already £65,000,000 has been sunk in the mines of the Orange Free State, most of it by Sir Ernest Oppenheimer's group. And many more millions will be needed before investors get their money back. Investors in these mines are going well beyond the normal British and South African groups and now include French, Swiss and American mining and finance houses.

**BRITISH GUIANA**—An American-backed company has been given a five-year concession to explore a rich columbite and tantalite mining area.

**SOUTH AFRICA**—Harmony Gold Mining Company, Ltd., Virginia, had sunk its ventilation shaft to a depth of 1,829 feet by the end of June. The 24-foot-diameter concrete-lined shaft is expected to be bottomed at 4,400 feet. The similar No. 3, hoisting shaft had reached a depth of 1,360 feet and will be sunk to about 4,800 feet.

**GOLD COAST**—With the installation of a new mechanized shovel in the surface workings, new drilling equipment and with exploration on the No. 16 level showing encouraging results, Bibiani (1927) Ltd. expects to raise its gold output slightly this year. Present output is about 30,000 tons monthly. A large percentage of the ore comes from the surface quarry and examinations for a possible outcrop south of this orebody are being

made. The total length of payable ore on the 17 level is over 500 feet. The mine is on the boundary between Ashanti and the Western Province.



LATIN AMERICA

**BOLIVIA**—As a result of discussions with the United States, Bolivia reportedly has agreed to increase her tungsten production, and the United States is making arrangements to buy most if not all of the output. Bolivia's three main mining firms, Patino Mines & Enterprises Consolidated, Cia. Aramayo de Mines and Hochschild's, and numerous small mines will be asked either to raise present output or to install equipment necessary to mine and process tungsten, if at all possible.

**CUBA**—The National Lead Company, New York, is said to have acquired an interest in the Nicaro nickel plant being reopened in Oriente Province by the United States' government. Rehabilitation of the property is under way with nearly 800 men at work. The plant's capacity is said to be 30,000,000 pounds of nickel oxide annually.

**SURINAM**—Gold production in the first quarter of this year amounted to 88,020 grams against 49,454 grams in the same period of 1950. Production of bauxite by the Biliton Company is averaging 40,000 tons monthly and the company reportedly plans to double output.

**MEXICO**—A mining department for the stimulation of mineral exploration and development in the State of Sonora has been created by Governor Ignacio Soto, who is rounding out his administration's public works and services program. Called the Departamento de Fomento Minero des Estado, it will gather and give out information on mineral resources of Sonora, will encourage the local prospector's interest in the identification of and

search for strategic and rare minerals and will instruct prospectors in their characteristics and mode of occurrence. Preliminary examinations of all findings will be made by the Departamento and its facilities will be available to prospectors to make claim surveys and find outlets for production. To head the Departamento, Governor Soto has appointed Manuel F. Quiroga, Sonora mining engineer and former mine superintendent of Moctezuma Copper Company, Phelps Dodge Corporation's Nacozari Unit.

**ARGENTINA**—In Jujuy Province, the Zapla mining company has started operating a second blast furnace, using iron ore from the immediate area. The first furnace produces 18,000 tons annually; the second has twice that capacity. The company expects that the two furnaces will satisfy the present domestic need for pig iron. Charcoal is used to operate the furnaces and to assure sufficient supplies of it about 35,000,000 eucalyptus trees have been planted in the district.

**COLOMBIA**—Production figures for the six months ended June 30, 1951, for the three Placer Development, Ltd., (of Canada), subsidiaries, Nechi Consolidated Dredging, Ltd., Asnazu Gold Dredging, Ltd., and Pato Consolidated Gold Dredging, Ltd., are as follows: Nechi—1,988,000 cubic yards dredged for a recovery of 9,462 ounces of fine gold; Asnazu—2,989,700 yards dredged for a recovery of 9,513 ounces; and Pato—9,841,400 yards dredged for a recovery of 86,886 ounces.

**PUERTO RICO**—The new iron mining firm, West Indies Mining Corporation, formed by Duluth, Minnesota, mining men, has announced that it plans to mine about 120,000 tons of ore yearly from the Keystone mine. The first shipment has been sent to the United States in converted LST's owned by Southern Trading Company of Delaware. James B. Hustad is president of the West Indies company; Walter Steinke is general superintendent, and Robert D. Crassweller is secretary-treasurer. (See World Mining, July.)

### BRAZIL AND THE UNITED STATES DEVELOPING AMAPA MANGANESE

Manganese ore is picked up off the ground by miners at an outcropping along the Amapari River in Serra do Navio, Amapa Territory, Brazil. Geologists are engaged in a large survey of the Territory and have estimated that up to 50,000,000 tons of manganese ore may exist there. Boulders of manganese lie along the river bank for some miles, and last year Brazilian and United States investors began a program to set up the transportation necessary to retrieve the ore. The Industria e Comercio de Minerios was formed by Brazil and the U.S. firm, Bethlehem Steel Company, which holds 49 percent of the stock. The company has a 50-year concession on manganese property in Amapa. By 1953 or earlier the first shipments of ore should begin and may eventually amount to as much as 500,000 tons yearly. Cost of installations, including port facilities, will be in the neighborhood of \$35,000,000.



## INTERNATIONAL

**BOLIVIA**—*Compagnie Aramayo de Mines* is now working tailing from the *Montserrat* company's property in Calli-pampa recovering zinc. The rise in zinc prices made the project feasible.

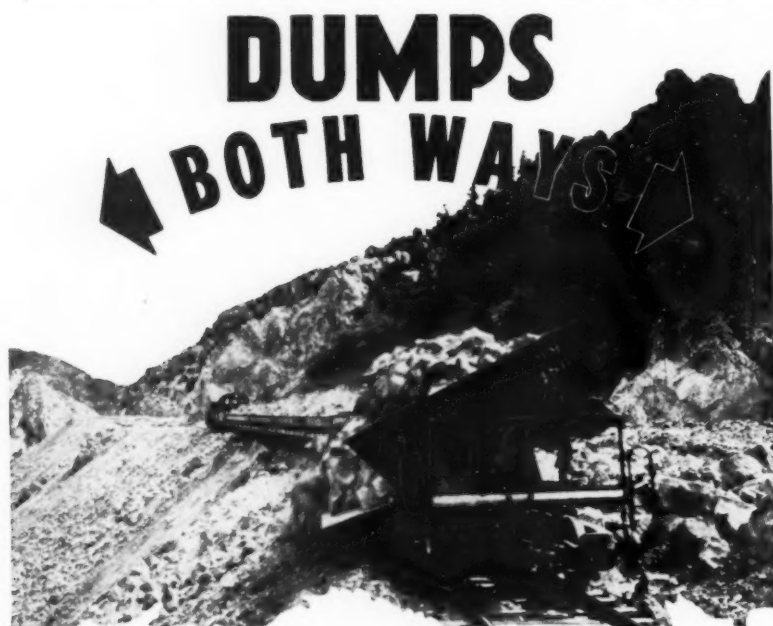
**BOLIVIA**—The 6,000-ton-daily HMS plant of *Patino Mines & Enterprises Consolidated, Inc.*, at Llallagua-Catavi is operating successfully and the company is planning to install another, smaller unit. The *Siglo XX* mine, from which most of the ore comes, is being converted to block-caving methods, and tests are being made on ore from the large tailing dumps

which may contain sufficient tin to treat. The company reports that its first quarter net income was about 54,400,000 bolivianos (\$900,000) and reports a loss of \$264,191.

**PERU**—*Cerro de Pasco Corporation* has ordered three 24,000 kilovolt-ampere waterwheel generators, four 25,000 kva. step-up transformers, three auto-transformers and 14 outdoor circuit-breakers for its new hydro-power plant on the Paucartambo River in south central Peru. The apparatus, ordered from Westinghouse Electric International Company,

will provide power for the corporation's operations at La Oroya, about 90 miles away, where installations for an ultimate production of 200 tons of zinc daily are being set up.

**BRAZIL**—The *Rio Doce Company* and the *United States Steel Corporation* are negotiating a new long-term contract under which half of the former's iron ore would be sold to the latter. By 1952 Rio Doce would be selling a total of 750,000 tons to U. S. Steel. Rio Doce plans to ship a total of 1,200,000 tons to United States companies in 1951.



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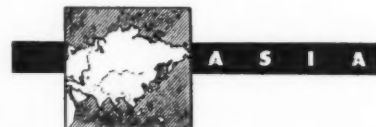
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**INDIA**—The *Tata Iron and Steel Company* will form a mining corporation with the Government of India to exploit the mineral resources of Orissa. The corporation, of which the Government will hold 60 percent of the shares, will exploit the manganese ore deposits in the Koraput district and the high grade chrome ores in the Keonjhar district.

**PALAU**—With an estimated 5,000,000 tons of bauxite available on this island, the Japanese are seeking a license to exploit it, which probably will be granted. The available supply would cover Japan's needs in her reduction works for up to 30 years.

**JAPAN**—Cobalt is on the restricted list in Japan and the use of commodities containing cobalt may also be restricted.

**INDIA**—Goa, Portugal's possession in India is becoming an important iron mining region. Recently, a Japanese delegation negotiated with the *Messrs. Chowgule & Company*, of Mormugao, to buy 500,000 tons of iron ore. The delegation was headed by Mr. Watanabe, president of the *Kokan Mining Company*, which imports raw materials for iron and steel industries in Japan. Considerable modernization of mining equipment and methods must be done in Goa, however, to maintain a constant supply of high-grade ore. Over 100,000 tons of Bellary iron ore also is said to have been sold to Japan. The main difficulties to using Bellary ore are a shortage of wagons and port congestion, particularly at Mormugao, the nearest port.

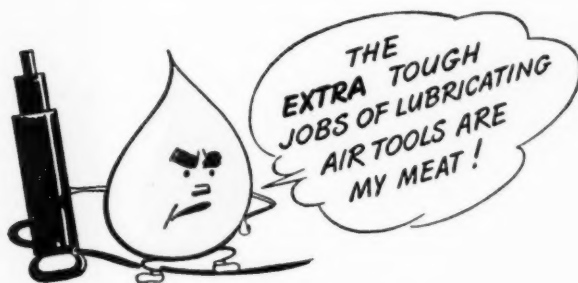
**INDIA**—The State Government of Madras reportedly will approve plans of a private company to build an aluminum plant to utilize the bauxite found in the Sheveroy hills in the Salem district. The plant would be ready to operate by 1955. The State Government of Rajasthan has decided to undertake development of Rajasthan fluorspar deposits itself. The deposits are said to be large enough to make the country self-sufficient.

**MALAYA**—A. G. Glenister, chairman of the Chamber of Mines, said that at the end of March, 1951, there were 741 tin mines and dredge units operating compared with 697 a year ago. The number of dredges came to 80 against 77 in 1950. Tin production in the six-month period ended June 31 amounted to 28,015 metric tons. European mines produced 17,273 tons and Chinese mines 10,742 tons.



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## EUROPE

**CZECHOSLOVAKIA**—A 1,000,000-ton-per-year pig-iron plant reportedly will be built in Czechoslovakia, with Russia supplying some of the equipment. Completion date was said to be 1955.

**FINLAND**—The extraction of crude ore in the five principal mines fell from 792,000 tons in 1949, to 684,000 tons in 1950, mainly because of strikes and fire damage at the Haveri mine. Ore treatment in 1950 yielded 162,000 tons of sulphur concentrate, 4,500 tons of zinc concentrate, 13,600 tons of electrolytic copper, 388 tons of refined nickel, 3,600 kilos of silver and 260 kilos of gold.

**EASTERN GERMANY**—At *Giesserei-Maschinenfabrik Lichtenberg* in the Russian zone of Berlin a three-ton electric furnace for special and alloy steels recently went into service. At *Edelstahlwerk Döhlen*, near Dresden, the first electric steel was produced in August.

**WESTERN GERMANY**—The *Gewerkschaft Merchnicher Werke* at *Mechnich* (Eifel) will modernize its mining equipment and install additional machinery in order to increase crude ore production from 3,000 tons daily to 6,000-7,000 tons. The ore mined contains from 1.3 to 1.4 percent lead. Production of refined lead is to be increased from 700 tons monthly to 1,400 or 1,500 tons. The mine reportedly has one of the largest low-grade lead deposits in the world, containing around 100,000,000 tons.

**ITALY**—Development of antimony deposits near Sassari, Sardinia, by the *Societa Mineraria Sarda* is planned at a cost of 1,000,000,000 lire. The company estimates that production of 8,000 tons per year for 15 years is possible. Negotiations with German manufacturing firms are under way in order to obtain necessary equipment and machinery.

**ALBANIA**—Owing to the sabotage of Albanian workers, the Russian Military Mission in Tirana has taken over the exploitation of chrome mines near Lake Ochrida.

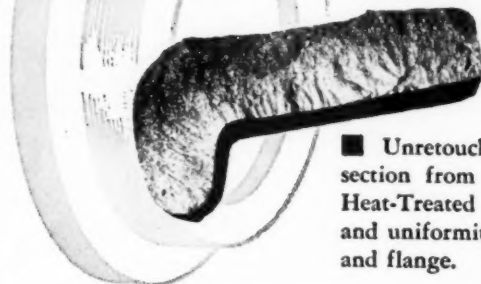
**FRANCE**—Annual production of iron ore has risen from 7,800,000 tons in 1945 to 30,000,000 tons in 1950, that of cast iron from 1,177,000 to 7,768,000 tons, and that of steel from 1,661,000 to 8,651,000 tons. During the first six months of 1951, 16,700,000 tons of iron ore were produced compared with 14,600,000 in the first half of 1950; 4,300,000 tons of cast iron against 3,700,000; and 4,850,000 tons of steel against 4,160,000.

**ENGLAND**—*South Crofty*, the Cornish tin, arsenic and wolfram mine, will return to the dividend list this month for the first time since 1945. During the last 12 months, the mine has obtained £56,000 more for its products than in the previous year. Output declined by 19 tons because of a labor shortage.

**YUGOSLAVIA**—The Yugoslavian Technical Mission has placed orders through the Ore and Chemical Corporation for two milling plants. One order is for a 100-metric-ton-per-day lead-zinc-pyrite differential flotation mill to be installed at the *Veliki-Majdan* mine. The entire mill, designed by the Western Knapp division of Wemco, will be prefabricated in the United States and

SEPTEMBER, 1951

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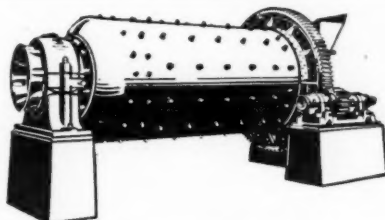


■ Unretouched photo of rim section from a card Semi-Steel Heat-Treated wheel. Note depth and uniformity of chill in tread and flange.

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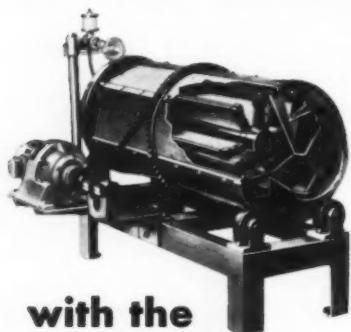
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[World Mining Section—31]



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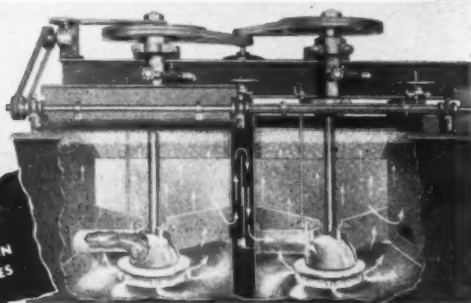
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## INTERNATIONAL

shipped complete for erection on concrete foundations. The second order is for a 50-ton-per-day gravity-flotation mill for the Zeleznik gold-tungsten mine.

**FRANCE**—France, which used to consume all her production of nitrate fertilizer, is now exporting to India, Egypt and Spain. Also, about 1,500 tons annually of corundum is being exported to Italy, Spain, Norway and Sweden.

**NORWAY**—The plans drawn up for the new aluminum plant at Sunndalsora, west Norway, reveal that capacity of the plant will be 40,000 tons annually, about as much as Norway produces now. Capital requirements are estimated at \$37,500,000, plus \$15,000,000 to expand the Aura hydroelectric plant's capacity. The Economic Cooperation Administration will assist by granting \$24,000,000 and will be repaid over a ten-year period by a supply of 7,800 tons of aluminum ingots yearly.

**NORWAY**—The Norwegian Parliament is studying a request for 35,000,000 kroner to complete reconstruction of *Sydvaranger, Inc.*'s iron works at Kirkenes, Finnmark province. The funds already provided for the work will be insufficient—original estimates were for 124,000,000 kroner, but costs are now estimated at 176,000,000. Part of the reason for increased costs is the plan to raise production capacity from 870,000 tons a year to 1,000,000 tons of iron concentrates.

**ITALY**—The *Societa Mineraria Trentino* has discovered iron and torbernite deposits in the Molveno Lake district and has asked the government for a research and exploitation permit. An estimated 2,000,000,000 lire would have to be spent to complete a survey of the ore zone and to start exploitation if sufficient ore exists.

**GREECE**—The Economic Cooperation Administration has authorized the purchase by Greece in the U. S. and possessions and Canada of \$500,000 worth of construction, mining and conveying equipment, of \$160,000 worth of certain miscellaneous industrial nonferrous metals, zinc, and nonmetallic minerals and their products, these to be obtained from the U. S. and possessions only, and \$200,000 worth of iron and steel mill materials and certain of their products.



NORTH AMERICA

**WYOMING**—The Wyoming Gulf Sulphur Corporation has awarded a contract to the O. W. Walvoord Company of Denver, Colorado, for the construction of a 100-ton-per-day elemental sulphur flotation mill west of Cody, Wyoming. Feed for the new mill, said to assay 40 percent

## WORLD MINING

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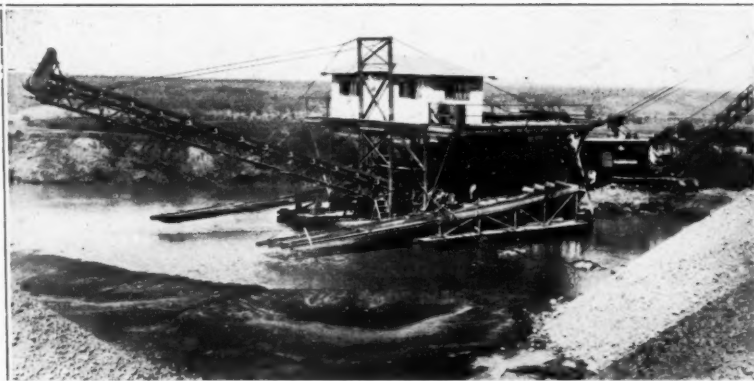
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## INTERNATIONAL

sulphur, is mined by openpit methods. The company considers the new mill to be a pilot mill only and anticipates the erection of a larger mill following the successful operation of the pilot plant.

**CANADA**—Base metals hold first place among industries in Canada, according to figures in the Bank of Canada's latest Statistical Summary. Gold went from second place to 14th in the period from before the war until now. Base metals' net in 1950 was \$129,200,000; next was pulp and paper, \$80,200,000. Gold was worth \$11,200,000 compared with \$35,300,000 in 1939. The figures are based on leading mines.

**NORTHWEST TERRITORIES**—Negus Mines has decided to install a 30-ton capacity Dorco Fluo-Solids roaster at its mine on the shores of Great Slave Lake in order to increase current gold recovery and to recover about \$500,000 tied up in concentrates. Last year the company operated at a loss, partly because of development costs and partly because gold extraction through amalgamation and cyanidation was around 76 percent. The new roaster should give a 90 percent re-

covery. Milling rate is about 235 to 240 tons daily.

**ONTARIO**—A 500-ton-daily cyanide tailing-treatment mill is being constructed by *Hellens Mining & Reduction Company, Ltd.*, at Cobalt Lake. The plant is designed for a possible capacity of 700 tons daily. The new company, headed by Dan Hellens, consulting engineer, will treat, on a royalty basis, about 1,000,000 tons of silver-bearing tailing owned by *Cobalt Properties, Ltd.*, and about 250,000 tons of tailing at the *Temiskaming* mine. The mill will operate the year around and about 30 tons of lake tailing will be removed by dragline per hour. A. D. Gillespie is manager.

**OHIO**—The Lake Superior Iron Ore Association reported that June consumption of Lake Superior iron ore totaled 7,499,475 gross tons, and total 1951 consumption through June was 43,629,328 tons.

**MANITOBA**—One of two furnaces in its zinc fuming plant has been placed in operation by the *Hudson Bay Mining & Smelting Company* at Flin Flon and the second should be operating soon. The units will increase the company's zinc

output by 30,000,000 pounds to a total of 130,000,000 pounds annually. Mine production is at present 5,000 tons daily, but when the new plant is running at capacity, 4,000 tons of mine ore will be treated daily and the remainder of the quota will be obtained from a 900,000-ton tailing pile.

**BRITISH COLUMBIA**—D. M. Cannon, mining geologist, has recommended that diamond drilling be done at the six-claim *Stewart Creek* property of *Arrow Tungsten Mines, Ltd.*, and that the property be developed by an adit at open cut No. 4 and by a drift on the ore zone plus 500 feet of raising to develop 350 feet of backs. The property has four ore exposures on the surface, all of which have been stripped and trenched over a length of from 100 to 350 feet. In three zones to a depth of 200 feet an estimated total of 66,000 tons of tungsten-bearing ore exists.

**OHIO**—The *Cleveland Cliffs Iron Company* in the six months ended June 30, 1951, had a net profit of \$4,547,220 compared with \$3,567,404 in the first half of 1950. The *M. A. Hanna Company* for the same periods reported a net profit of \$5,539,537 compared with \$4,544,572 in 1950. These companies are among the larger iron ore producers in the Minnesota-Michigan iron districts.

**QUEBEC**—Development work at the *Suffield* mine of *The Asco Metals Corporation*, Sherbrooke, is opening up ore widths greater than indicated by surface diamond drilling. Frederick E. Hall, mine manager, reports. On the second level south of the shaft crosscut, the drift being slashed out to the ore limits has a width in excess of 45 feet, and north of the shaft crosscut, the drift averages from 12 to 30 feet of ore which is somewhat more irregular because of heavy faulting and a strong fold. The company says that sufficient development work in the mine will be done soon to increase mill rate from the present 100-to-150 tons daily to 200 tons. Late in the year, rate should be up to 400 tons daily. The increased production from the *Suffield* will allow a gradual decrease in the *Moulton Hill* mine output so that more development can be done there. The shaft at the latter will be deepened another four to five levels.

**NEW YORK**—*Newmont Mining Corporation* lists its net profit for the six-month period ended June 30, 1951, as \$3,019,749.98. The company's stock interest in United States, African, Canadian and other countries' mines amounts to \$75,415,177.53. Its miscellaneous stocks of and loans to corporations and other undertakings constitute a fair value of \$36,689,014.00.

**OHIO**—The *United States Steel Company* has put a blast furnace at its Ohio works back into action after rebuilding it in a record-breaking four months and 18 days. The usual time for rebuilding is at least nine months. The furnace will produce about 112,000 more tons yearly—its former capacity was 510 tons daily and now is 1,100 tons daily.

**ALASKA**—The *Edgemcumb Exploration Company*, Sitka, is developing a lode gold property at Silver Bay and at present is engaged in underground development work, drifting and sinking. The company has been in active operation since 1947 doing extensive building and

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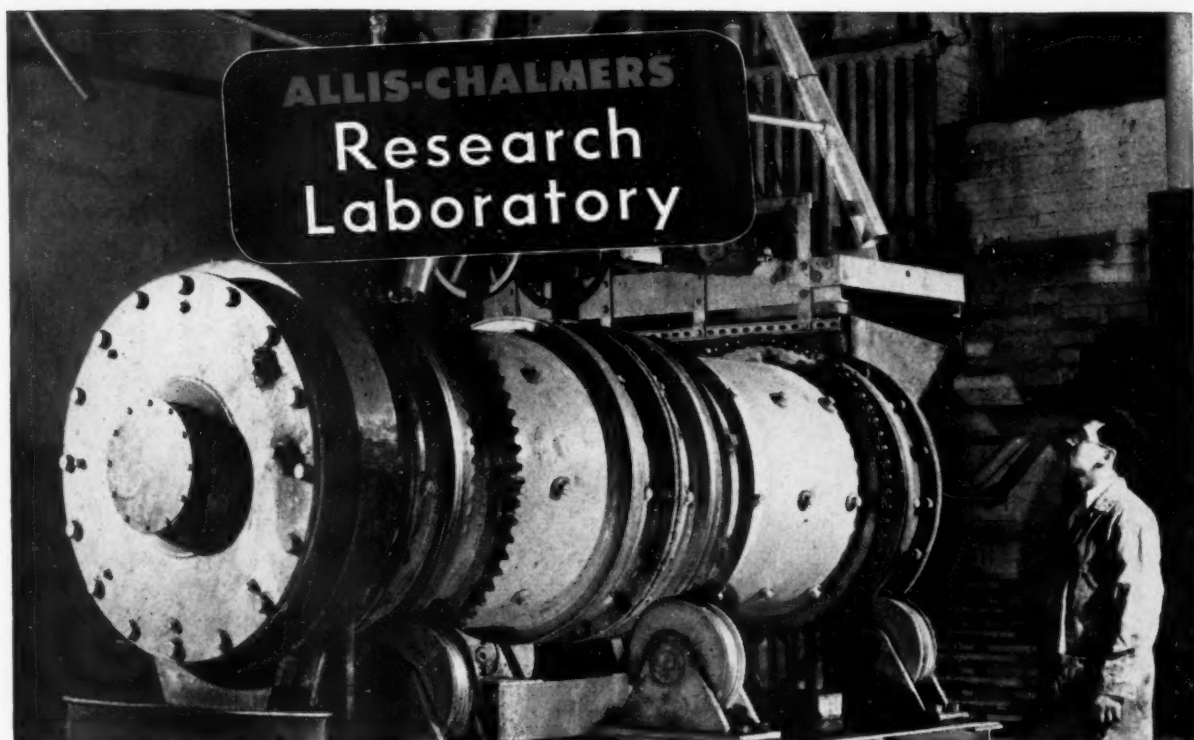
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NIAGARA FALLS, N. Y.

## INTERNATIONAL

development work. This spring mill changes were made and mill tests run. The company is said to be the only one in southeast Alaska actively engaged in lode mining. Glenn H. Morgan is treasurer and general manager.

**UNITED STATES**—A joint research venture directed toward the development of improved processes for the production of titanium metal has been announced by Charles Allen Thomas, president of *Monsanto Chemical Company*, and Richard S. Morse, president of *National Research Corporation* of Cambridge, Massachusetts. Work initiated by National Research Corporation will be greatly expanded under terms of the agreement, and additional work will be carried on at Monsanto's Central Research Department at Dayton, Ohio. The project will be under the direction of Dr. Robert A. Stauffer, vice president and technical director of National Research Corporation, and Dr. N. N. T. Samaras, Monsanto's Central Research Department director.

**BRITISH COLUMBIA**—*Silver Standard Mines, Ltd.*, Hazelton, reports for the year ended March 31, 1951 net profits of \$777,898. During the year \$21,041 tons were milled with a gross value of \$1,901,225. About 74 percent of the total was silver and zinc, and the balance gold, lead and cadmium. The company is sinking a main, three-compartment shaft 500 feet providing levels at 150-foot intervals. Crosscutting and then drifting on the No. 4 and No. 6 veins is the main project now. An extension of the No. 6 vein recently was found with high values indicated.

**ALASKA**—*Native Bismuth, Inc.*, is the name of the corporation recently formed to develop the Charley Creek bismuth prospect 35 miles north of Nome, Alaska. Officers and directors of the company are O. A. Margraf, I. Kowalski, Wilson and Dave Russell and M. McDonald. McDonald, a well known mining man, has just become interested in the property.

**PENNSYLVANIA**—The steel producing subsidiaries of *United States Steel Corporation* crossed the 3,000,000-ton mark in the production of steel ingots for the first time during the month of May, 1951, with operations for the entire organization at 104.3 percent of rated capacity for the month. The new high record for May was 3,000,437 net tons of

ingots, an increase of 54,086 tons over the previous high mark of 2,946,351 tons set in March, 1951. Subsidiary companies which set high records during May were the *United States Steel Company* and the *Tennessee Coal, Iron and Railroad Company*. Other steel making subsidiaries of United States Steel operated at levels close to previous high records and all exceeded standard rated capacity.

**ONTARIO**—An expenditure of \$450,000 to increase operations at *Matarrow Lead Mines'* property in Yarrow Township in the Matachewan area has been recommended by E. K. Fockler, consulting geologist. The mine could then be brought into production in early 1952. The company has sunk a three-compartment shaft 187 feet and proposes to sink it to 335 feet. About 350 feet of lateral work has been done on the 150-foot level and further sinking would lead to opening a second level at 300 feet. Underground exploration has indicated about 50,000 tons of semi-proven and possible ore. Drifting has opened four ore sections amounting to 475 feet and averaging 9.8 percent lead, and 4.3 percent zinc over an average sampled width of 4.8 feet.

**BRITISH COLUMBIA**—Gross production at the *Victor* property of *Viola Mac Mines Limited* for 1950 was valued at \$428,207 from the treatment of 2,486 tons of ore with an average value of \$171.92 per ton. Net earnings for the year amounted to \$176,227.72. Average grade of mine run ore has been 29.2 ounces silver, 24.2 percent lead and 10.59 percent zinc. Ore has been entered on the bottom, 700-foot level of the Victor, a fact that improves the ore outlook below the 300 level for the *Lone Bachelor* vein in an adjoining property. The *Lone Bachelor* will be reopened this year and a 700-foot adit driven.

**LOUISIANA**—*Freeport Sulphur Company's* Bay Ste. Elaine project to produce sulphur will consist of a plant capable of supplying nearly 2,000,000 gallons of superheated water daily to melt the sulphur. The plant will be built on barges at Grande Ecaille, 75 miles from the dome by water routes, and the barges floated to the mine site (on land mostly under water) and sunk in place. Molten sulphur will be transported by barges to the company's storage facilities at Port Sulphur.

## 10 or MORE Product Sizes with this "CPC" Classifier

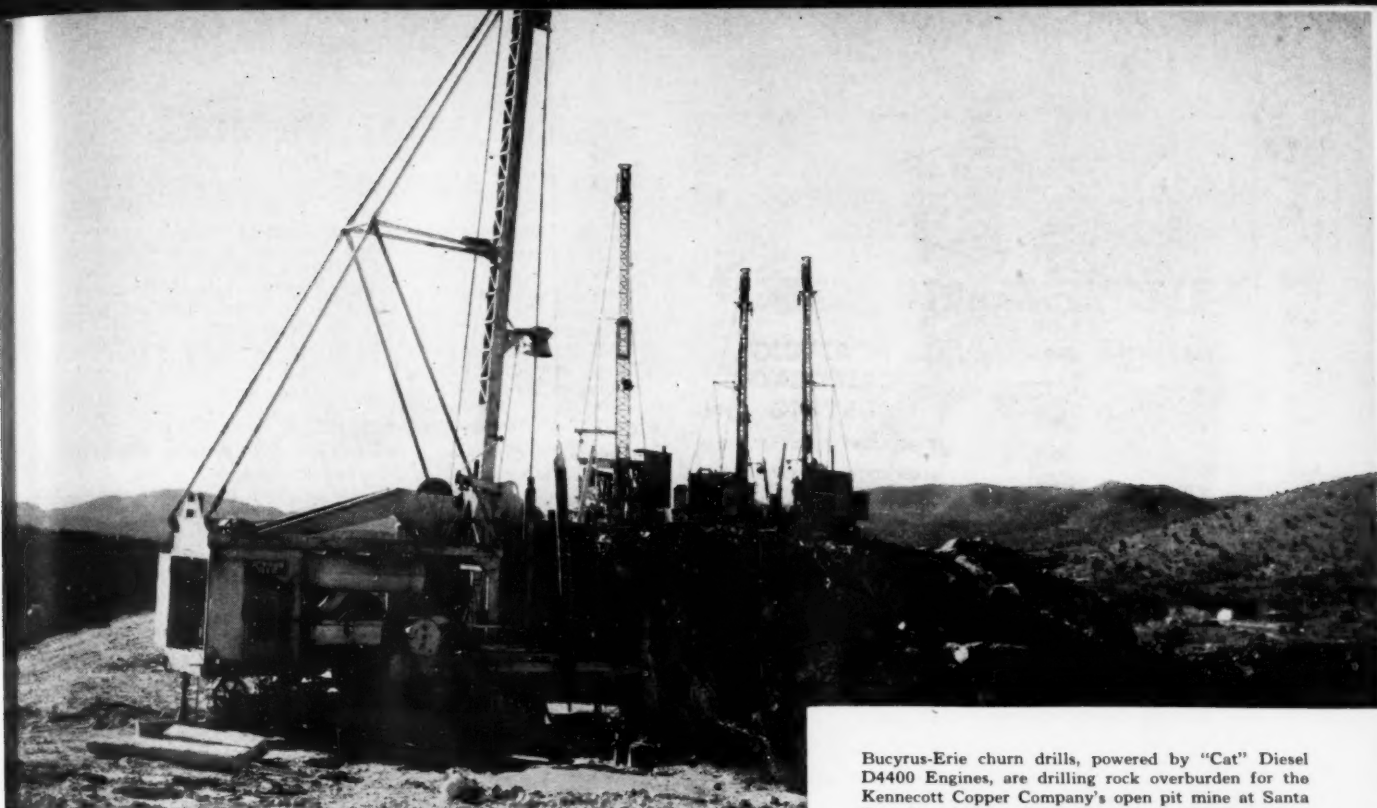


The Conenco "CPC" Classifier delivers simultaneously and continuously up to 10 or more accurately classified spigot products. Adjustment of individual cells produces these splits to your sizing requirements. Each cell has a pressure chamber at the bottom, a sorting column just above and a launder section at the top. No moving parts. Send for details.

### THE DEISTER CONCENTRATOR COMPANY

925 Glasgow Avenue

Fort Wayne, Indiana



Bucyrus-Erie churn drills, powered by "Cat" Diesel D4400 Engines, are drilling rock overburden for the Kennecott Copper Company's open pit mine at Santa Rita, New Mexico. Isbell Construction Co., Reno, Nevada, is the contractor. A "Cat" Diesel No. 12 Motor Grader is used to maintain haul roads. Three "Cat" D8 Tractors complete the big yellow team on this operation.

# There's a big job ahead

How your equipment stands up in the months ahead has a real bearing on America's fight to be strong and stay free. Our \$2,800,000,000 mining production must be maintained or increased this year as a vital factor in defense. And we're entering a period when drilling machinery and other essential heavy-duty tools must stand up or else!

Military needs and Defense Rated Orders are taking their share of "Caterpillar" production. Shortages of steel and other materials add to the difficulty of supplying the demand for new machines. This means that *present equipment must be kept in use.*

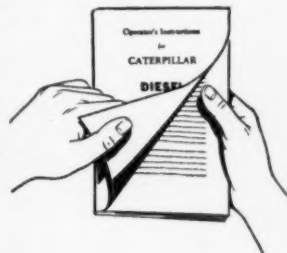
"Cat" Diesel Engines, Tractors, Motor Graders and Earthmoving Equipment are built with the stamina to serve you long and faithfully. But *how long* is up to you and the operation and maintenance you give them. Good care pays off.

You can add many hours to equipment life if you follow sound maintenance practices. Anticipate your parts needs *before* wear goes beyond repair. Talk it over with your "Caterpillar" dealer. He is qualified to give competent opinion. If a part is not readily available, he has the tools and knowledge to rebuild many worn parts — and keep your machinery on the job.

CATERPILLAR TRACTOR CO. • San Leandro, Calif.; Peoria, Ill.

## You're the Doctor

Don't let your engine overheat. Maintain the cooling system, keeping it free of scale, rust and sediment. Use soft or treated water and, when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator periodically, removing foreign matter from the core by brushing or washing. Use chemical flushing solutions. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book.



# CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES  
TRACTORS  
MOTOR GRADERS  
EARTHMOVING EQUIPMENT





## MULTIPLE HEARTH FURNACE

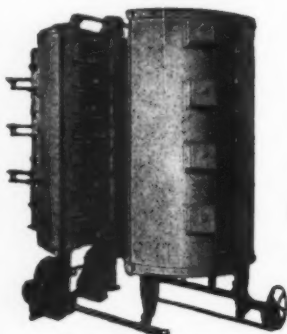


SIZES 8' 6" TO 22' 3" DIAMETER  
NUMBER OF HEARTHS, 1-16

### ROASTING CALCINING DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
TIN ORES	MOLYBDENUM
NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASH	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY GRANULES
PYRITE	ANTIMONY

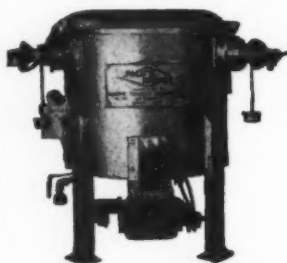
SELENIUM  
SEWAGE SLUDGE  
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METALLIC SLUDGES  
FILTERING MEDIA  
And for Numerous  
Other Materials



Pacific Laboratory Furnace

### PACIFIC LABORATORY FURNACE

Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.



Pacific Furnacing Unit

**NEW  
PACIFIC FURNACING UNIT**  
Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.

**PACIFIC FOUNDRY COMPANY LTD.**  
*Engineers and Metallurgists*

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## QUICK METALLURGICAL CALCULATIONS

T. W. Molthen, mining and metallurgical engineer and assayer at the Summit King Mines, Limited, Fallon, Nevada, has furnished additional simplified metallurgical calculations covering the figuring of the moisture content of crushed ore, and a method for obtaining the desired specific gravity of acid solutions less than the original specific gravity.

All equations used were proved by actual laboratory tests. In all equations the specific gravity of water used is considered as 1.0.

### Quick Moisture Determination:

Into a density can, put enough ore (about  $\frac{5}{8}$  to  $\frac{3}{4}$  full) and weigh. Add water to this using an iron rod to stir so that water will reach all voids. When thoroughly mixed add water and fill to mark. Weigh this. The difference between weights would be the amount of water added in grams and cc's. Care should be exercised in doing this to obtain correct specific gravity of the ore.

Example:

First weight equals 1,161.5 grams. Now water is added.

Second weight equals 1,669.5 grams. The difference is the amount of water added which equals 508 cc.

Using the equations, the above becomes as follows:

$$X \text{ cc. water in ore} + 508 \text{ cc. water added} = 2.44 Y \text{ cc. ore} = 1669.5$$

$$X \text{ cc. water in ore} + 508 \text{ cc. water added} = Y \text{ cc. ore} = 1000.0$$

$$\text{Subtracting} \quad 1.44 Y \text{ cc. ore} = 699.5$$

$$Y \text{ cc.} = 699.5 \div 1.44 = 485.8 \text{ cc. dry ore.}$$

$$485.8 \text{ cc. ore dry}$$

$$508.0 \text{ cc. water added}$$

$$993.8 \text{ cc. dry ore and added water.}$$

$$1,000.0 - 993.8 = 6.2 \text{ cc.} = \text{the amount of water that was in the ore to begin with.}$$

$$6.2 \div 1,161.5 = 0.0053 \text{ or } 0.53 \text{ percent moisture.}$$

### Specific Gravity of Acid Solutions:

A laboratory worker is sometimes confronted with this problem:

Dissolve residues in 60 cc. of  $\text{HNO}_3$ , specific gravity, 1.135. Not having a set of tables nor a hydrometer he has to figure it out some way and again the equations are applicable to this case.  $\text{HNO}_3$  usually comes in bottles and they are marked 1.42 specific gravity on the table, so he has to dilute this acid to conform with directions.

Without the hydrometer nor the table of dilution he can figure it out as follows:

$$X \text{ cc. H}_2\text{O} + 1.42 Y \text{ cc. HNO}_3 = 1.135 \text{ the desired specific gravity}$$

$$X \text{ cc. H}_2\text{O} + Y \text{ cc. HNO}_3 = 1000 \text{ cc.}$$

$$\text{Subtracting: } 0.42 Y \text{ cc.} = 0.135$$

$$Y \text{ cc.} = 0.135 \div 0.42 = 0.321 \text{ cc. HNO}_3$$

$$\text{and } X \text{ cc. H}_2\text{O would equal } 1000 - 0.321 = 0.679 \text{ cc. H}_2\text{O.}$$

$$\text{Proof: } 0.321 \text{ cc. HNO}_3, \text{ specific gravity, } 1.42 = 0.321 \times 1.42 = 0.45582$$

$$0.679 \text{ cc. H}_2\text{O, specific gravity, } 1.00 = 0.679 \times 1.00 = 0.679.$$

$$\text{Adding}$$

$$1.000 \text{ cc} = 1.13482 = 1.135$$

The ratio would be 3.21 of acid to 6.79  $\text{H}_2\text{O}$  or 1.0 of acid to 2.1  $\text{H}_2\text{O}$  would give the desired dilution.



### WEIGHTOMETER

Use the WEIGHTOMETER for accurate, dependable tonnage controls in mills and concentrators. Since 1908 WEIGHTOMETERS have helped many mines and mills to obtain efficient operation. Automatically records and totalizes without interrupting flow.

Easily installed, simple, fully enclosed, durable.

**MERRICK SCALE MFG. CO.**

172 Summer Street

PASSAIC

NEW JERSEY

there are 6 reasons why a  
**Traylor TC Gyratory**  
 can produce huge tonnages  
 day after day . . .

1

Straight line bar type cast steel spider has an extra heavy hub. Absolutely non-wearing. Simple but strong.

2

Main shaft, forged of low carbon high grade steel, is of minimum length but of maximum diameter for greater strength.

3

The patented Traylor dust seal is positive protection against dust and grit getting into the lubrication chamber.

4

Traylor's original self-tightening bell head and curved concaves practically eliminate choking and packing . . . save power waste by applying power as a direct crushing force.

5

A positive, automatic pump-type lubrication system has a water cooled oil reservoir.

6

Self contained counter shaft bearing . . . fitted with roller bearings . . . is automatically lubricated as is the machine cut steel gearing used in the Traylor T.C.

The rugged design of a Traylor TC Gyratory gives it the stamina to stay on the job . . . day after day . . . with only routine servicing. It accounts for this large volume primary crusher's outstanding ability to produce huge tonnages at an extremely low cost per ton. If you need more production . . . or lower costs . . . you need a Traylor TC Gyratory. Send for free literature that gives full details.

Mail Coupon  
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# Traylor

Rotary Kilns, Coolers and Dryers • Grinding Mills  
 Jaw, Reduction and Gyratory Crushers • Crushing Rolls  
 Apron, Grizzly, Slurry and Table Feeders.

SEPTEMBER, 1951

[World Mining Section—39]

TRAYLOR ENGINEERING & MANUFACTURING CO.  
 386 Mill St., Allentown, Pa.

I want to know all about a Traylor TC Gyratory

Name

Company

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SALES OFFICES: New York, N.Y.; Chicago, Ill.; Los Angeles, Calif.  
 CANADIAN MFRS: Canadian Vickers, Ltd., Montreal, P.Q.

A "TRAYLOR" LEADS TO GREATER PROFITS

65

# PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.

## FREE-LITERATURE PREVIEW

To get any item of free literature illustrated or described in the *Production Equipment Preview*, note the key number of that item, circle the corresponding number on the PEP coupon, and mail it to Mining World, 121 Second St., San Francisco 5, Calif.

**ELECTRIC MOTORS:** Allis-Chalmers' totally enclosed fan-cooled motors with tube-type air-to-air heat exchangers are described in a new 8-page two-color bulletin. Designed for heavy and medium duty, TEFC motors are available in squirrel-cage, wound-rotor, and synchronous types. Circle 6.

**SAND PUMP:** Pumping problems created by pulps carrying sand and other abrasive solids are answered in Western Machinery Company's newly released bulletin on the WEMCO sand pump. Circle No. 10.

**TRICONE MILLS:** A catalog describing the operating principle of the Hardinge Company tricone mill, including a discussion of ball segregation, design features and performance data, has been released. Circle No. 11 for your bulletin, AH-414.

**DORRICO FLUOSOLIDS SYSTEM:** Applications to roasting of refractory gold ore concentrates, copper and zinc concentrates, pyrite. Literature available from MINING WORLD, or from Dorr Co., Stamford, Conn. Circle No. 27.

**ROCK BIT ENGINEERING SERVICE:** Free booklet on multi-use, carbide insert or one-use "Spiralock" bits available from Rock Bit Div., Timken Roller Bearing Co., Canton, Ohio, by circling PEP No. 33.

**MINING MACHINERY:** A new 28-page two-color bulletin describes the complete line of machinery manufactured by Nordberg Manufacturing Co., Milwaukee 7, Wis. Miners and mill men will get valuable information by reviewing this line of Diesel engines, Symons Cone Crushers and Screens, mine hoists, grinding mills, and railroad equipment. Circle No. 39.

**CENTRIFUGAL PUMP:** The new Ingersoll-Rand Class HMTA pumps, available in 3-, 4-, 5-, or 6-inch sizes in from 3 to 9 stages, are high-pressure (to 1200 psi), high-capacity (to 1600 gpm) centrifugal pumps for shaft and other heavy mine, mill, or smelter duty. Catalog "IR-HMTA Pumps," describing these easy-to-repair pumps, is available by circling 46.

**SCREENS:** The many types and sizes of Denver-Dillon screens are illustrated and described in Bulletin S3-B11, just off the press and released by Denver Equipment Company. Get your copy by circling 51.

**BATTERY CHARGER:** Completely automatic motor-generator battery-chargers manufactured by The Electric Products Company, are described in a new 4-page, 2-color bulletin. Circle 52.

**RUBBER PIPE:** The latest issue of "Rubber Developments" describes the use of rubber pipe for loading bauxite ore into ships, for pumping copper water from mines, and for handling pulps which contain up to 30% high-silicon sand. Circle 53.

**MATERIAL-HANDLING EQUIPMENT:** Lake Shore Engineering Company has just released a 12-page bulletin describing its complete line of flight- and belt-type portable conveyors, under-car unloaders, and other products. Circle 54.

**ENGINES:** Five International carburetor-equipped power units, ranging from the 16.5-hp. U-1 to the 55-hp. U-9, are described and illustrated in International Harvester Export Company's new 12-page booklet, E-63-A. Circle 55.

**BELT CLEANER:** SACO's spring-type conveyor cleaner consists of a group of spring-steel wiper blades which clean the belt at the point of delivery. If sticky ore or concentrate has created a belt problem in your plant, circle 56 for more information on a proven belt cleaner.

**BATTERY MAINTENANCE:** A new 56-page revised edition of "Instruction and Technical Data for Gould Rubber Jar Batteries" has just been released; it is packed with valuable information on care and maintenance of lead-acid batteries. Circle 57.

**SINGLE-DRUM HOISTS:** Joy Manufacturing Company's new 16-page bulletin describes the complete line of Joy single-drum hoists for mining and surface work. Bulletin "Joy 76-X," with complete descriptions and specifications of hoists from 500 to 3500 pounds is driven by Turbinair, Pistonair, electric, or gasoline engines. Circle 58.

**FEEDERS AND CONVEYORS:** Catalog 830, "Jeffrey-Traylor Electric Vibrating Feeders and Conveyors," is a comprehensive 88-page book on the Jeffrey-Traylor electric vibrator and its use on a wide variety of vibrating feeders and conveyors. Circle 59.

**BUCKET LOADERS:** A new 8-page 2-color bulletin describes and illustrates Haiss Bucket Loaders, which are self-propelled bucket elevators for use in loading three yards per minute of coal, topsoil, sand, gravel, and other materials. Circle 60.

**EARTH MOVERS:** A new 24-page booklet, form 30160, released by Caterpillar, describes the Caterpillar DW20 and DW21 tractors; illustrations include cutaway views of the tractors and their larger components. Circle 61.

**DIAMOND DRILLS:** Bulletin No. 71 describes, illustrates and gives mechanical and operating data on the Longyear Wolverson diamond core drill for underground drilling. The unit may be powered by either air or electricity, with mechanical or hydraulic head, and is designed for drilling to 800' with EX bits, or 600' with AX. Circle 62.

**CHAIN DRIVES AND CONVEYORS:** Bulletin 51-7, released by Chain Belt Company, illustrates the installation, operation, and maintenance of chain drives and conveyors, and describes briefly but clearly "how to get the most out of your chain drive." Circle 63.

**SCREEN HEATER:** Developed especially to facilitate screening of fine materials by elimination of blinding of the screen, the Hannon Electric Screen Heater consists of a step-down transformer, buss bars, and other equipment. Hannon's illustrated descriptive bulletin cites increases of up to 50% in screen capacity. Circle 64.

**PIT TRUCKS:** A 16-page 2-color bulletin describes Euclid's new 22-ton Model TD rear-dump pit trucks. Features of the new six-wheeler are spring-mounted rear axle, hydraulic booster steering, choice of Cummins or Buda diesel engine. Circle 65.

**RUBBER TIRED DOZER:** LeTourneau 19 mph. Tournadozers reduce deadhead cycle by 2.5 to 1, offers increased mobility, making for drastic economies in stripping operations. For information on model circle 66.

**MAGNETIC DRIVE:** A new 32-page booklet discusses "Precision Speed Control with the Electric Machinery Adjustable-Speed Magnetic Drive." The booklet covers the use of Magnetic Drives and Regutron controls for pump, compressor, fan, and other installations. Circle 67.

**MAGNETIC SEPARATION SERVICE:** Dings Magnetic Separator Co., which offers free testing of 25-pound ores samples, will run the samples on Improved Dings Cross-Belt Separators, return the separated samples to you and make recommendations as to the feasibility of magnetic separation. For free information on the Dings Improved Cross-Belt Separator, circle 68.

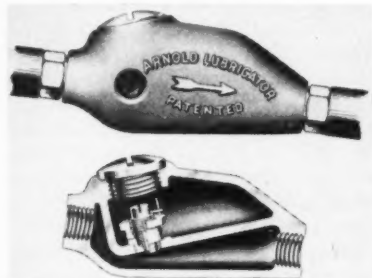
**IMPROVED SECONDARY CRUSHER:** New TelSmith Gyrasphere offers new advancements in crusher design and operation. Circle 73 for bulletin Tels-274.

**REVERSE FEED STOPPERS:** New compact Thor drills ranging from compact Model 200 to heavy-weight 600 offer simplified design, air cushioning, extra bearing surfaces and other features to sharply reduce out-of-service repair time. For complete literature or on-job demonstrations, write to Independent Pneumatic Tool Co., Aurora, Illinois, circle 79.



## Streamlined Air-Line Oiler Has Window

The Rucker Company, 4228 Hollis St., Oakland, Calif., has just announced availability of a ½-pint 7"-long air-line oiler. For use with rock drills and other air-operated equipment, the new oiler has several handy features: an adjustment by

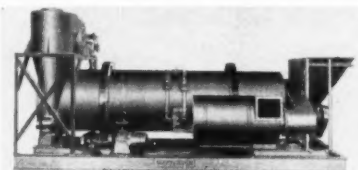


which the operator can regulate oil feed to his machine; a window which shows him how much oil is left in the reservoir; and streamlined shape which permits him to pull it around corners without catching.

For further information on Arnold oilers, in four sizes from 1/16- to one-pint, circle PEP No. 97.

## New Rotary Dryers Come As Packaged Units

The Patterson Foundry & Machine Co. of East Liverpool, Ohio, has recently placed on the market a packaged drying unit which consists of a rotary dryer

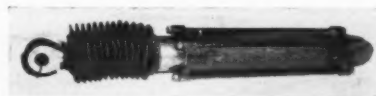


with drive, screw feeder, air heater, fan and dust collector, integrally mounted on a steel frame.

In a number of standard sizes, 2', 2'6", and 3' diameters, and in lengths from 10' to 24', the dryer is available in plain and stainless steel, as well as with pure white, acid- and abrasive-resistant Porox linings. Circle PEP No. 100 for further data and prices.

## Neoprene Accordion Window Protects Parts

The accordion sleeve, shown below on an air cylinder, fits over moving parts, rotary or reciprocating, keeps them clean,



and protects the men who work near them. Called Gortite sleeves, they are made in sizes from 2 to 12" I.D., 2" to 30' in length, and will fit virtually any application. Made of a neoprene base, they are impervious to oil, greases, gas, or water at minus 60 to plus 180° F. For complete information, write to A & A Mfg. Co., 2017 W. Clybourn, Milwaukee 3, Wisconsin, or circle PEP No. 98.

## New Pocket-Size Geiger For Uranium Hunters

A new Geiger counter, smaller than a pound of butter, and powered by a flashlight cell, is manufactured by Precision Radiation Instruments, Inc. The "Snooper" sells for \$24.95 equipped with a plastic case, earphone and complete instructions. For further information, circle 87.

## New Rear-Sprung Eucls; Heated Bodies Optional

Two new models of 22-ton rear-dump off-the-road Euclid trucks have just been released. The first model, 45TD, is pow-



ered by a 286-hp. Buda. The second, 45TD, is powered by a 300-hp. Cummins diesel.

Both models are equipped with free-floating rear springs, a proven tire-saving feature; they are rated at 32 mph. under full load, equipped with an air-assist clutch, and hydraulic booster steering. On both, a heated, cold weather body is optional equipment.

Euclid Road Machinery Company, Cleveland 17, Ohio, has just released a 16-page two-color catalog which describes these two new mining trucks. Circle PEP No. 96 for your copy.

## Air Scrubber Is Key to Underground Diesels

The Ruth Company, Denver, Colorado, has just released an illustrated 16-page booklet on the use of Ruth underground diesel locomotives. The performance of various units on specific underground jobs is described. Of particular interest is a description of the diesel exhaust gas conditioner, the key unit of the loco-

otive, which removes acid and oily compounds from exhaust gas, and which can be used on stationary diesel installations. Circle PEP No. 78 for the new booklet and further information.

## Koroseal Electrical Tape: A Natural for Mines

The B. F. Goodrich Co., Akron, Ohio, has just announced availability of a new Koroseal electrical tape which is a natural for use in mines, mills, smelters. This "stickum" can be pressed repeatedly on a dry surface and will not lose its stickiness, and it will not transfer to the non-sticky side. The tape has a high dielectric strength (8000 volts), is flexible, highly waterproof, highly abrasion resistant and flameproof, resistant to acids, oils, alkalis and corrosive salts. Get it from your electrical dealer.

## You Can't Keep A Good Man Down!

Nine years ago, they said William B. Kirk, of Kermit, W. Va., was through as a tractor operator when he lost his right arm on an airport construction job.

Kirk had an idea that he could operate a crawler tractor with his feet and took



his problem to Rish Equipment Company, Bluefield, W. Va., International Harvester Distributors.

Manual controls on an International TD-14 crawler with Bucyrus-Erie 'dozer were replaced with a series of pulleys and wire cables, entirely pedal operated. The solution has proved completely practical—and William B. Kirk is a going concern!

### PEP Editor

September '51

**MINING WORLD, 121 Second St., San Francisco 5, Calif.**

Please send me complete and free information on the following equipment described in your PEP section, and keyed by the numbers I have circled:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CIRCLE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
NUMBERS	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
YOU	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
DESIRE	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Also send further free information on the equipment advertised on page:

\_\_\_\_\_ ; Product \_\_\_\_\_ ; Manufacturer \_\_\_\_\_

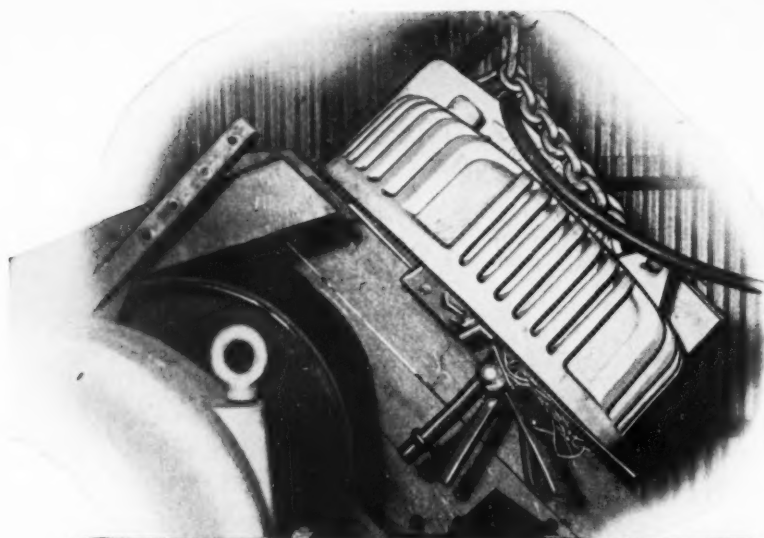
\_\_\_\_\_ ; Product \_\_\_\_\_ ; Manufacturer \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## REMOVE TRAMP IRON *Before* DAMAGE Starts!



Here is the positive, economical way to protect crushers, grinders, pulverizers and other vital equipment — use a STEARNS Suspended Magnet over your conveyor or head pulley.

### CIRCULAR SUSPENDED MAGNETS

*Stearns* Suspended Separation Magnets are powerful units for removing tramp iron from various kinds of conveyed materials where protection to crushers and other processing machinery is necessary. Eliminating foreign metal means fewer repair bills on crushing equipment, fewer shutdowns and higher production.

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### Bassick Mine

Continued from Page 24

\$2,000,000 in gold was produced from a deposit near the surface. Ore was shipped from the mine from time to time until 1915. In 1923 the dump was treated by cyanidation. In 1926 the mine was reopened by a company which leased it for ten years. This company built a new mill at the mine for the reduction of ores.

When the Bassick mine was discovered a small settlement called Bassickville which contained a saw-mill, a saloon, a three-story hotel, and a smelting works sprang up around the property. The townsite was plotted in 1880 by the Bassick Mining Company and lots were leased to "parties who became residents". The new owners of the mine are thought to be responsible for changing the name of the town from Bassickville to Querida.

On Aug. 28, 1882, the *Silver Cliff Daily Herald* commented that the town was "keeping up to its name as the most lively of any of the little places in the state. Rosita, although close by, is fast crawling into the shade. Every building in Querida is occupied. It is even about to have a drugstore, an office and a lively stable."

That year the population rose to 2,000 and remained fairly constant until 1884 when the mine was first shut down and 400 men were thrown out of work. The camp was pretty well deserted by 1890 and by 1895 less than a dozen families remained. The closing of the Bassick mine was the final blow to both Querida and Rosita as there was no other industry in either town to support a population. Subsequent leaseings of the property have not restored the town.

Before leaving Querida I climbed to the top of the big dump at the site of the mine and looked down over the waste that had once been the town. Less than a dozen buildings dot the meadow—a false-fronted store, a mine shed, a schoolhouse and one frame house are the best preserved of those in sight. Below on the dump lay huge wheels and drums, belts and hoppers and the rusty and bleached remnants of the great mill that had once thundered at the foot of the hill. The stream cuts its way through the oxide-stained sediment of the settling pond and the wind whistles through the rigging of the windlass on the crest of the dump.

MINING WORLD

## MANPOWER SHORTAGE

*To the miner let me say that he stands where the farmer does; the work of the world waits for him. If he slacks or fails, armies and statesmen are helpless. He also is enlisted in the great service army.*

WOODROW WILSON.

We repeat the Wilson quotation to give emphasis to the importance of the requirement for a steady and increasing mineral output. Our leaders tell us that we are now in an armament race for defense that may last for years, and that it demands an ever-increasing production. We are constantly astonished at the blindness of official Washington, especially in the executive departments. It should be apparent to all that a constant and increasing mineral production is the first requirement in this race, for mining alone can supply the tools and raw materials needed in every armament industry. Read again: "If he slacks or fails, armies and statesmen are HELPLESS"—no bombs or shells while our peoples die under the attacks of the invaders.

How well we remember the hundreds of times, during World War II, we had to read the dismal news—production falling—manpower shortage! At that time Arthur Gaeth of radio station KSL made a careful study of that problem, and, after the broadcast, made the result of that study available to us. We wrote General Lucius D. Clay, then with the Army Services of Supply, giving him a summary of the Utah material, which clearly showed the relation of the manpower shortage to the falling mineral production. It was suggested that not only must the drafting of miners be stopped, but also the miners then in the Army should be furloughed to work in the mines. Similar suggestions came to him from other directions. The Army supply officers made their own investigation, and the furloughing of 4,000 miners for work in the mines was ordered. At first the working of the plan was unsatisfactory, but later it gave results in an increased production of minerals.

Now, we have a new emergency thrust upon us, and already there is an allocation of metals that is disturbing the steady rise in production that must be maintained if our program is to succeed. It is absolutely certain that a severe shortage of manpower will develop in the near future as more industries reach their production peak. Already, agriculture has been given a program under which its workers, who have been certified as essential, may be deferred from the draft.

If the mining industry is to profit by the lessons of the past, and not be caught short as it was 10 years ago, it seems logical that plans should be made to have miners also deferred from the draft. If it is not possible to gain this concession we should, at least, be allowed to have such miners certified as essential on the records of their draft boards so that they may be called back when a crisis develops.

While this is being written our radio informs us that a call for a strike vote in the nonferrous metal industries has been sent out. If there should be a strike, and necessarily the subsequent conference, it seems proper that the first item on the agenda should be a clear definition of the functions that belong to labor, and those that appertain to management. In this way it will be made apparent if the union has eliminated the communistic influence, as has been stated.

*The Wanderer*

SEPTEMBER, 1951

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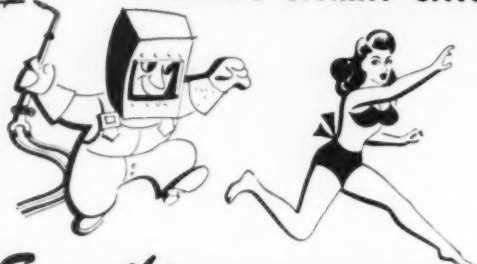
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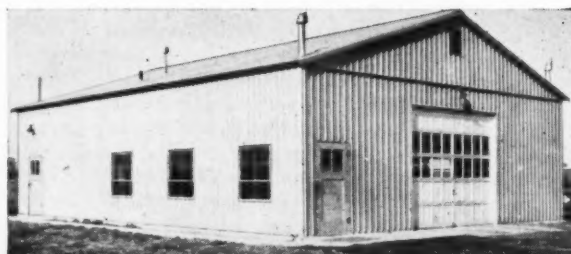
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### THE DEFENSE MINERALS ADMINISTRATION GRANTS MORE LOANS TO COLORADO FIRMS

The Defense Minerals Administration has approved numerous mineral exploration projects in Colorado in the past month or so and has agreed to grant from 50 to 90 percent of the money that various companies plan to spend on their projects. The percentage granted depends on the kind of mineral that will be produced. Following are some of the companies whose applications for aid have been approved recently:

The Bonita Mining and Development Company, Inc., has started exploration at the Emma, Oregon and Dolina properties in the Ice Lake Basin, San Juan County, and will open up and clean out the Nos. 1, 2, 3 and 4 adits. The DMA granted the company \$9,000, 50 percent of proposed expenditures. After rehabilitation Bonita will do 400 feet of exploratory drifting on the Emma 4 level and 600 feet on the 5 level to explore the Emma lead-zinc vein. Henry Ehrlinger of Silverton is supervising the work.

Frank Landauer has been awarded \$15,000, 50 percent of proposed expenditures, for the development of the Minerals Slope Nos. 1, 2, 3 and 4 claims in San Juan County. He will drive 500 feet of drift northeasterly on the Mineral Slope lead-zinc-copper vein.

John A. and Ben A. Smith of Silver Plume, Clear Creek County, have received \$25,000 to dewater the Phillips and Dunkirk shafts and then to drift 330 feet on the 90-foot sublevel of the Phillips and 330 feet on the 120-foot sublevel of the Dunkirk zinc mines. Other exploratory work consists of cleaning up caves and raising on the 730 vein.

Shelby-Johnson Mines, Inc., is continuing development of its mine through an adit on Loveland Mountain in Park County. Using DMA funds, the company is carrying on a drifting and raising program along the Shelby-Little Pearl and Connoran zinc-lead veins cut by the crosscut adit.

The U. S. Oil and Development Corporation, Silverton, San Juan County, is exploring for extension of the zinc-lead-copper orebody mined at the Lark mine during World War II. The "Joe and John" adit will be extended to explore the Lark "chimney" orebody at depth. DMA is financing the work on a 50/50 basis. Carl Peterson is general manager.

George L. and Arthur B. Beardsley have started sinking at their Lady Franklin zinc-lead mine at Westcliffe, Custer County, in order to find extensions of orebodies at depth.

The Utze Lode Company's DMA funds are being used to explore the Madonna lead-zinc mine at Monarch, Chaffee County. Mining crews under the direction of Harold Koster of Salida, manager, have started to dewater the Madonna winze and will then develop the mine's lower levels.

The most recent report from DMA lists

further Colorado companies, the amount of their DMA grants and the metals involved but lists no development details. However, these firms are as follows: In Boulder County—Boulder Tungsten Mines, Inc., tungsten; Eureka tungsten mine, tungsten, \$10,500 (75 percent); Cold Spring Tungsten, Inc., tungsten, \$158,310 (75 percent); Tom C. Stanford, tungsten, \$7,500 (75 percent); and Tungsten Mining Company, tungsten, \$7,500 (75 percent). In San Miguel County, East Ridge Company, lead-zinc, \$30,090 (50 percent). In San Juan County—Cement Creek Leasing Company, lead-zinc, \$2,425 (50 percent); and Moreno-Cripple Creek Corporation, lead-zinc, \$38,000 (50 percent). In Dolores County—Erickson & Baer, lead-zinc, \$1,600 (50 percent). In Ouray County, Bachelor Development Company, lead-zinc, \$36,252 (50 percent). And in Larimer County, Cherokee Mines, uranium, \$12,600 (90 percent).

Three South Dakota companies also have received loans: The Keenan Properties, Inc., operating in the Black Hills, Lawrence County, received \$90,000 from DMA, 90 percent of proposed expenditures, to explore for tungsten, tin, columbite, tantalum and gold. The Black Hills Keystone Corporation, Pennington County, received \$12,600 (90 percent), for mica-beryl development. And Gladys Wells received \$3,600 (90 percent), for mica-beryl development in Custer County.

COLORADO

The Ozark Mahoning Company of Tulsa, Oklahoma, has entered into an operating agreement with the Western Fluorspar Company for operation of Western's mines and 400 ton per day HMS mill at Northgate, Jackson County, Colorado. Mike Cloonan of Cowdrey, Colorado, will direct operations.

The Climax Molybdenum Company recently blasted a large "coyote hole" at its Climax mine, Lake County, Colorado. The blast broke more than 200,000 tons of molybdenum ore adjacent to the mine's caved area and above the old White level. The broken ore will be drawn from the cave on the Phillipson (underground level) and trammed to the mill. C. J. Abrams, general superintendent, was in charge of the blast.

The U. S. Atomic Energy Commission has announced that forms for uranium-bonus payments may be obtained by writing P. O. Box 270, Grand Junction, Colorado. The AEC will pay the bonus on the first 10,000 pounds of uranium production from a new deposit. A mining property normally should comprise 15 acres of surface for bonus purposes, and payment will be made only for production made after March 1, 1951.



### LEADVILLE TUNNEL, HAYDEN SHAFT JOINED

Pictured here is the Hayden shaft of the Cadwell Mining Company in Leadville, Lake County, Colorado. A lateral has been driven 150 feet from the Leadville Drainage Tunnel to connect with the shaft 20 feet above its bottom and some 480 feet below the collar. The connection insures adequate ventilation of the tunnel and affords a second exit in case of any trouble in the tunnel proper. The mining company is cleaning up and retimbering the upper levels of the Hayden mine to develop zinc-lead ore under terms of the contract the company entered into with DMA calling for the expenditure of \$50,000. Roger B. Patrick of Leadville is superintendent of the Cadwell Mining operations.

The Empire Zinc Company, a subsidiary of the New Jersey Zinc Company, has been granted amortization on \$100,000 of \$125,000 applied for and to be used for enlargement and modernization of its Canon City, Colorado, zinc sulphide roasting plant. The plant roasts Eagle mine (Gilman, Colorado) zinc concentrate. The calcine is shipped to company plants at Depue, Illinois, and Palmerton, Pennsylvania.

F. Schendler and Company has started operating a new perlite crushing and sizing plant at Antonito, Colorado. The plant has a capacity of 40 tons per hour and produces several sizes of perlite for sale to expansion plants. Part of the plant's output will be shipped to the Joliet, Illinois, plant of the Schendler Company to be expanded for use in plaster and in wall board.

The Front Range Mines, Inc., is employing 14 men at its Strong mine in Victor, Teller County, Colorado. Daily

shipments of 25 tons of gold ore are being made to Golden Cycle Corporation's new Carlton custom mill, which serves the Cripple Creek district. John Deerkson, Denver, is Front Range's president.

The Vanadium Corporation of America is mining 40 tons of roscoelite ore per day at its Barlow Creek vanadium-uranium deposits in San Juan County, Colorado. Mining operations are directed by W. L. Anderson. The ore is trucked over the company's recently built Hermosa road to its milling plant at Durango.

The Great Eastern mine in Burns Gulch, San Juan County, Colorado, has been leased by C. W. Fleming, Joe Slade and Ed Knolls of Silverton. The partners are cleaning out the workings preparatory to development and mining. During the past several years the mine was operated by the Great Eastern Mining Company which made large shipments of high grade silver-lead ore from the mine. Fleming was mine foreman for the Great

Eastern Company and will supervise the newly planned work because of his knowledge of the mine.

A new jig concentration mill is in operation near Lakewood, Nederland mining district, Boulder County, Colorado. The plant is treating low-grade tungsten ore, less than 0.5 percent WO<sub>3</sub>, from lessee operations at mines controlled by Hetzer Mines, Inc. A. B. Weldon and Harrison Cobb of Boulder are operating the mill.

**SOUTH DAKOTA**

The Lithium Corporation of America is building a 200-ton-per-day spodumene flotation plant at its Edison mine in Hill City, Pennington County, South Dakota. The new flotation plant will replace the corporation's existing HMS plant. H. B. Munson, chief metallurgist for the Lithium Corporation, developed the flow sheet and designed the plant. O. W. Walvoord Company of Denver, Colorado, is building the mill under contract.

**UTAH**

The Kennecott Copper Corporation applied to DPA for quick amortization on \$1,946,096 for copper and molybdenum production from its Bingham Canyon, Utah, property. Permission was granted to write off 75 percent.

The iron mines of Utah, producing a record 407,132 gross tons of iron ore in April, were the main factor in the highest monthly tonnage ever recorded for the western states—695,644 tons.

The Bullion Monarch Mining Company has found uranium ore on the surface of its Farmer John claim at Marysville, Piute County, Utah. This ore was found while preparing a drilling site for the U. S. Atomic Energy Commission and is believed to be a different orebody than that mined by openpitting. R. N. Cooper, Bullion Monarch's general manager, reported the find.

Zenda Gold Mining Company has started to extend the Wasatch Drain Tunnel at Alta, Utah, a minimum of 500 feet. Immediate goal is the projected downward extension of the Flagstaff fissure which was mined extensively above the tunnel level. J. Troy is in charge of Zenda's development, which also will entail deepening of a winze on the No. 3 orebody. The Wasatch Mines Company owns the ground and has leased it to Zenda on a sliding-scale royalty basis on all ores shipped.

The United States Atomic Energy Commission is using five diamond drills to prospect for uranium on private claims in the Marysville, Utah, district, has a geologic mapping crew in the district, and is preparing a geologic map. The Commission also has stationed C. E. Collins, mining engineer, at Marysville to give advice and aid to prospectors and miners of uranium ore in the Marysville, Piute County, and Temple Mountain district, Emery County.

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### DMA Grants More Loans to Central-Eastern Firms

The Defense Minerals Administration has approved several contracts for exploratory work on properties in the Central-Eastern states.

In Wisconsin in the Upper Mississippi Valley, E. P. Scallon of St. Paul, Minnesota, mining engineer and operator, will spend \$7,500, of which the DMA granted half, for 4,000 feet of churn drilling. The lead-zinc property is part of and adjacent to the Little Grant Mining Company operation.

The Calumet & Hecla Consolidated Copper Company will spend \$158,518, of which DMA granted half, for 81,250 feet of churn drilling on lead-zinc property involving 29 mineral leases and 6,000 acres, mostly in Lafayette County, Wisconsin. The Vinegar-Hill Zinc Company of Platteville, subsidiary of the Youngstown Sheet and Tube Company, will drive 1,300 feet of crosscuts from the East-Black-Stone lead-zinc mine to the Hancock orebody, and 500 feet of drifting in that orebody. Total cost is \$45,704.75, and DMA is granting 35 percent of the money.

The Dodgeville Mining Company, Madison, Wisconsin, was reported last month to have received a grant. The money, \$5,000 of a total \$10,000 to be spent, will be for 7,500 feet of churn drilling on the I. E. Weigel zinc property in Iowa County.

Other grants are as follows: In Arkansas, the Arkansas Manganese Company received \$15,000 (75 percent of proposed expenditures), for manganese exploration in Polk County. In Missouri, Bootman & Boswell Mining Company will explore lead-zinc showings in Lawrence County, and the National Lead Company will explore cobalt-nickel, lead and copper showings in Madison County.

In Tennessee, L. W. and L. R. King and C. K. Scott received \$6,768, or 90 percent of funds necessary, for cobalt-manganese exploration in Bradley County. And in Vermont, in Orleans County, The Ruberoid Company, The Flintkote Company, and the Philip Carey Manufacturing Company each will explore asbestos showings.

### New Lakes Shipping Firm Acquires Ore Carrier

Acquisition from the Maritime Administration of a C-4 vessel which will be converted for bulk freight service on the Great Lakes has been announced by Hanna Coal and Ore Corporation and the Sand Products Corporation of Detroit, Michigan.

The vessel will be owned by the Hansand Steamship Corporation, a newly formed company owned jointly by Hanna Coal and Ore and Sand Products. It will be operated by Hanna as agent and is expected to be ready for the 1952 shipping season.

The ship, now known as the *Marine Robin*, was built in 1944 by the Sun Ship Building and Dry Dock Company at Chester, Pennsylvania. It has overall length of 522 feet, beam of 71 feet 6 inches, molded depth of 43 feet 6 inches, and a power plant of 9,000 horsepower.

Conversion details are not yet available, but the enlarged vessel will handle cargoes of around 18,000 tons.

### New Jersey's Ringwood Mines to Be Reopened

The old Ringwood iron mines at Ringwood in the Ramapo Mountain district of Passaic County, New Jersey, have been bought by the newly formed Ringwood Mines, Inc., for \$1,500,000 and will be reopened. The company is said to plan production of iron concentrate for sale to eastern furnace operators and may do research into the possibility of turning out iron powder and phosphorous. Col. Lewis Sanders is president of the firm.

The mines, which were worked from 1740 until the 1930's, consist of the Peter and Cannon and several worked-out units. The property covers 877 acres, with mineral rights to 174 adjoining acres, and an estimate of ore reserves has been put at 1,500,000 tons. In 1942 the Government took over the property, spent about \$4,000,000 to build a mill and improve a shaft and underground workings, but did no mining. Now, besides the mill buildings there are 68 dwellings, a railroad spur and other facilities. According to New Jersey State Geologist Meredith E. Johnson, the Ringwood mines are the best prospect in the state, and by using systematic mining methods could produce 250,000 tons of ore yearly.

Oaks mine near Dover, New Jersey, where additional equipment is being acquired to mine at deeper levels. The hoist, a Nordberg, is driven by a 1,750 hp. General Electric d.c. motor, will lift 250 tons of iron ore up a 3,840-foot shaft every hour. Operating at a rope speed of 2,315 feet per minute, the hoist will deliver a nine-ton load to the surface every two minutes.

Applications have been made to the DPA for accelerated amortization for expansion of facilities by the following companies in recent weeks: *Allegheny Ludlum Steel Corporation* of Watervliet, New York, \$135,244 for titanium metal melting facilities, 75 percent certified; and *Orefraction, Inc.*, Pittsburgh, Pennsylvania, \$73,148 for magnetite ores, 75 percent certified.



### C-C-I DRILLS ON MARQUETTE RANGE

This diamond drill rig is typical of six now being operated by the Cleveland Cliffs Iron Company for exploratory work on the Marquette range of Michigan. All six rigs are engaged in virgin exploration within the corporate limits of the city of Ishpeming. Drilling will be to depths of 4,000 feet or more, requiring ten to twelve months to accomplish. Of the six drills, one is Diesel-powered and five are steam powered. All have modified oil-well derricks. Cleveland Cliffs also is operating 13 additional diamond-drill rigs on the Marquette range, nine below ground in existing mine workings. Drill rigs below ground are operated by compressed air and the balance above ground are powered by gasoline engines. These 13 drill rigs are all operating at shallow depths. Principal production of the company at the present time in the soft ores of the Marquette range comes from depths of 1,200 to 2,500 feet. E. L. Derby, Jr., chief geologist, is in charge of the company's diamond drilling operations; he is assisted by B. H. Boyum, assistant chief geologist. Both men are headquartered in the company's engineering building at Ishpeming.



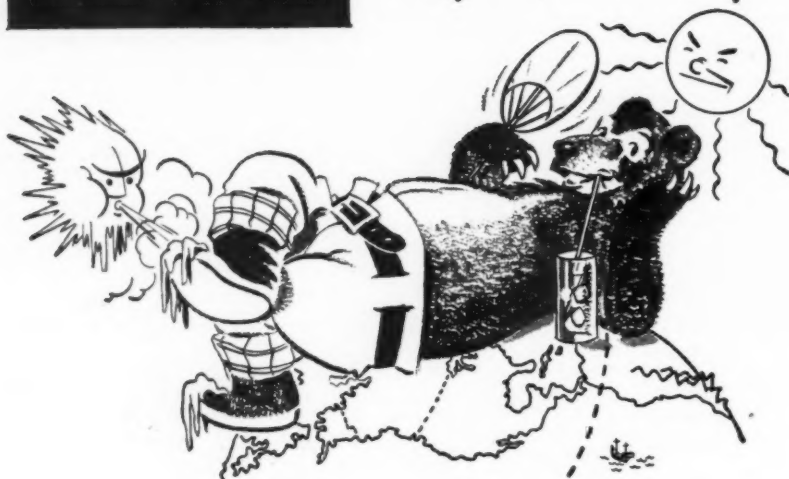
A new blast furnace with an annual capacity of 480,000 tons will be erected at the Weirton Steel Company's plant at Weirton, West Virginia. Weirton is a subsidiary of the National Steel Corporation which is raising its annual ingot capacity to 6,000,000 tons by 1953, compared with an ingot capacity of 4,700,000 tons as of January 1, 1951. The expansion in steel capacity was announced by Ernest T. Weir, chairman of National Steel.

The Federal Government has added bauxite and halloysite to the list of minerals for which prospectors and mine operators can be grubstaked. DMA said 50 percent of the cost of exploring for these minerals would be contributed by the government. The halloysite, needed by industry, now is of catalytic grade.

A new hoist is being installed by the Alan Wood Steel Company at its Scrub

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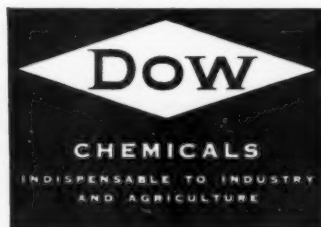
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Battelle Institute, Columbus, Ohio, has begun construction of a new million-dollar laboratory in order to handle increased demands for research services. Battelle's research volume now surpasses \$8,000,000 annually and includes studies for the AEC, Army, Navy and Air Force.

For the six months ended June 30, 1951, the Jefferson Lake Sulphur Company's net earnings were \$436,723.73 compared with \$326,161.92 in the corresponding 1950 period. The company has completed its Starks Dome plant and began producing sulphur from the property in June, by the Frash process. Currently negotiations are under way for sulphur rights on certain properties in the Gulf Coast area which appear promising. Negotiations are also under way with several companies and individuals for the erection of plants using the company process for extraction of sulphur from sour natural gas and refinery gases, according to Eugene H. Walet, Jr., president.



Pickands, Mather & Company has begun proceedings to effect an exchange of 3,800 acres of forest fee lands in St. Louis County, Minnesota, for 2,760 acres of tax-forfeited lands in the taconite formation area of northern St. Louis County. Following an official appraisal of the timber lands, if the county board approves the exchange, a public hearing will be held and the application will be referred to the state for final approval.

The National Production Authority has approved the construction of the \$7,000,000 taconite pilot plant of the Reserve Mining Company at Babbitt, Minnesota. The building of 80 houses, expected to cost \$800,000, will be started this fall. Contracts have been let for the relocation of more than a mile of No. 61 highway at Beaver Bay and for street grading and excavations for water mains and house foundations for the homes to be built at Beaver Bay. The ultimate program will cost an estimated \$50,000,000 to \$60,000,000. Some well informed men expect the taconite concentration program to develop more rapidly than has been expected.

The Humphreys spiral plant at the Grant mine of Inter-State Iron Company, Buhl, Minnesota, in operation since mid-June, is expected to produce about 65,000 tons of fine concentrates during 1951. Crude ore for the plant comes from the old wash-ore tailing basin and is moved by a Sauerman scraper to a feeder and belt conveyor which deliver it to the plant. Plans have been made to move the 48-primary and 24-cleaner-spirals plant to the Hill-Annex mine at Calumet in 1952 to treat wash-ore tailing from that mine. The company's Schley mine at Gilbert, which began loading ore on June 4, is scheduled to produce 400,000 tons this season while future yearly shipments may reach 500,000 tons. About 1,400,000 cu. yds. of surface material were moved to reach the ore. The plant is designed to screen and crush merch. ore and to wash the crushed product when necessary.

Drag-line conveyor stripping operations at the Morton mine of the M. A. Hanna

**MINING WORLD**

Company are on a 21-shift-per-week basis while shovel-truck operations are intermittent. The South Agnew mine is operating 18 shifts per week. At this property more of the old Oliver Iron Mining Company dump, south of the South Agnew, is being removed to provide for the south-pit bank slopes. Most of the equipment for the new South Agnew shop has been received and set up. In addition to the 32-cubic-yard end-dump truck, which is being operated on an experimental basis, an experimental rubber-tired bulldozer is also being tried out. Meanwhile, work is underway on a heavy density plant at the Messabi Chief mine of the company and at the Section 13 mine some structural drilling is being done.

Work is progressing rapidly at the Jones & Laughlin Ore Company's Tracy mine at Negaunee, Michigan, taking full advantage of the summer season. The stock-pile area is being graded and shaft house and mine buildings are being erected. Partridge Creek and the C.&N.W. Railroad tracks must be moved in the near future.

Two  $2\frac{1}{2}$  cu. yd. Diesel shovels have been delivered in the Iron River district of Michigan for The M. A. Hanna Company. One is used to load ore at the Richmond mine and the other to load stock-pile at the Hiawatha.

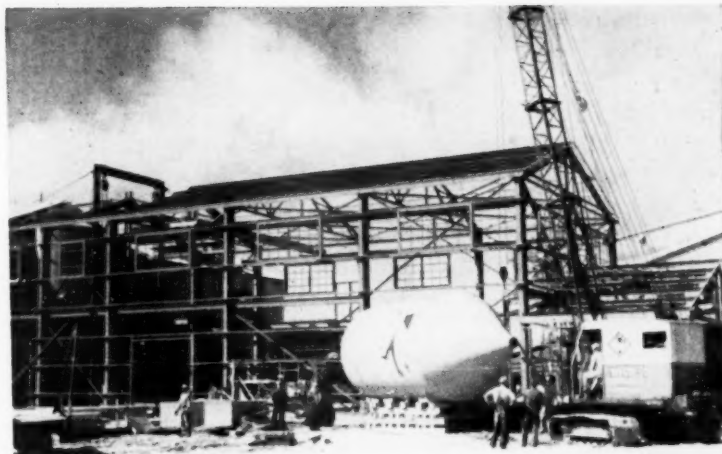
The Proksch Construction Co. of Iron River, Michigan, is constructing a combination machine shop—dry and office building; an engine house and a garage at Inland Steel Company's new Cayia mine. Concrete foundations for the engine-house equipment are also being installed.

The Bacco Construction Company of Iron Mountain, Michigan, is stripping at the old Groveland mine near Randville for The M. A. Hanna Company. Enough stripping will be done at this old property to permit mining and stock-piling 25,000 tons of the low-grade ore. The Western-Knapp Engineering Company meanwhile is constructing a pilot concentration plant which is 113 by 56 by 60 feet in height. Hanna officials believe that 25,000 tons will be sufficient to determine the feasibility of operating the orebody on a commercial basis. J. B. Richardson is in charge of the construction for Western-Knapp. He states that the plant will have 100 pieces of processing equipment and hopes to have the plant ready for operation by fall.

Erection of the steel headframe at the Iron-ton mine at Bessemer, Michigan, is under way. Shaft sinking at this Pickands, Mather & Company property is about to begin and a contract has been let for the erection of the new engine house.

At the Wauseca mine, one of The M. A. Hanna Company's largest producers in the Iron River district of Michigan, a portion of the ore is screened to obtain a lump-ore product running from  $\frac{3}{8}$  to 4 inches in size, which is very popular with furnace men.

Zontelli Brothers' heavy media and jig plant, which is located at Pabst "G" shaft, Ironwood, Michigan, is in operation. It handles lean ores from the old dumps which accumulated during the years when the "Norri group" of mines was operated by the Oliver Mining Company, ore too lean to be utilized at that time. Ore from the several old shafts is hauled by trucks to the plant.



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## precipitates—NORTHWEST

### NORTHWESTERN MINING FIRMS RECEIVE GRANTS FROM THE DEFENSE MINERALS ADMINISTRATION

Exploration in the northwest will be stepped up as a result of the granting of more Defense Minerals Administration loans. The companies receiving the latest grants are as follows:

In Idaho the United Minerals Reserve Corporation has received a matching-fund \$104,000 loan for lead-zinc exploration in the Warm Springs district of Blaine County. The company's holdings include 13 claims of the Homestake group; 11 claims of the Long Grade group; 41 claims of the Paymaster group; and five claims of the Silver Eagle group. All funds are to be expended on the Homestake-Long Grade claims to recondition workings, to do 1,600 feet of additional drifting and 100 feet of sinking. George W. Snyder, Jr., is president of the firm.

DMA and the Bradley Mining Company of San Francisco have agreed that two exploration projects for the company's Ima mine at Patterson, Idaho, will be undertaken at a total cost of \$72,750, of which DMA's share is \$54,562.50. The Ima is considered the fourth largest tungsten mine in the U.S. (The principal tungsten mineral is huebnerite and scheelite accounting for 10 percent).

The Hermada Mining Company has received a grant to continue developing its openpit antimony property 20 miles southeast of Atlanta, Idaho. At last re-

ports this company was said to be producing 40,000 pounds of antimony monthly, which was being custom-milled by flotation at Atlanta. Ernest Oberbillig is president.

Highland-Surprise Consolidated Mining Company, Wallace, Idaho, has been granted \$100,000 by DMA for the company's \$200,000 project of development and exploration. The work includes 1,800 feet of drifting and crosscutting on the 1,300 level to explore the easterly extension of the Surprise vein and the downward extension of the Highland orebody; about 80 feet of crosscutting on the 1,450 level to provide stations for 1,000 feet of down hole diamond drilling on the Surprise ore shoots; and the sinking of 400 feet of offset shaft and crosscutting on the 1,600 and 1,750 levels if the diamond drilling shows favorable structures at those levels. The company currently is producing from 100 to 120 tons of lead-zinc ore daily from the Surprise orebody. Frank J. Luedke, president, says.

Paymaster, Inc., a new corporation, has been formed by the Spokane-Idaho Mining Company to operate the Paymaster mine about 30 miles west of Arco, Blaine County, Idaho. The DMA loan to Paymaster was \$21,500 (50 percent of proposed expenditures) and will be used to explore for lead-zinc.

Other Idaho men and firms receiving recent loans include L. S. Heller, who was granted \$300 of \$600 to be spent for lead-zinc in Valley County; Johan P. Holtermans, \$3,897 of \$7,794, to be spent for fluorspar exploration in Custer County; Idaho Mining Company, \$61,869 of \$122,738 for lead-zinc development at the Washington-Idaho mine in Shoshone County; and J. W. & G. S. Bleazard and Earl and Fred Shirts, \$4,200 of \$8,400 for lead-zinc exploration in Custer County.

In Montana, the Alps Mining & Milling Company has received \$20,000 to block out a 15,000-ton reserve of tungsten ore in the recently acquired Argo mine near Clinton, Missoula County. The program, to be completed about the end of September, consists of driving 100 feet of raise and 220 feet of tunnel and sinking 100 feet of winze. Upon completion, a tungsten circuit will be added to the mill and both tungsten and gold concentrates recovered. A production rate of about 100 tons per day is planned. James P. Smith is president and general manager.

Other Montana mines receiving funds were The Florence Company, \$20,690 (50 percent of proposed expenditures) for lead-zinc exploration in Cascade County; Golden Messenger Corporation, \$30,938 (50 percent) for lead-zinc exploration on its 12-claim property, 22 miles northwest of Helena; Bennett Mining Company, \$50,000 (50 percent) for lead-zinc exploration in Cascade County; Key-Durand, a loan of unknown size for its lead-zinc mine near Drummond, Granite County; and Taylor-Knapp Company, which will do further development at its Moorlight manganese claims near Philipsburg, Granite County.

In Washington, The Black Warrior Company, Inc., has received \$100,000 to explore further its copper-lead-silver property in Chelan County, near the Howe Sound Company's famed Holden mine. Frank Funkhouser of Spokane, president, said the company has blocked out about 75,000 tons of ore and now expects to be able to block out enough more to warrant construction of a mill.

Other Washington mines received the following amounts: American Zinc, Lead & Smelting Company, \$60,000 (50 percent) for lead-zinc exploration in Pend Oreille County; Goldfield Consolidated Mines Company, \$11,527 (50 percent) for lead-zinc in Stevens County; G.O.P. Antimony Company, \$7,313 (75 percent) for antimony exploration in Okanagon County; and John Nasburg and associates, \$3,780 (50 percent) for a lead-zinc prospect in Stevens County.



### CHANNEL PLACER WORKED IN HELENA

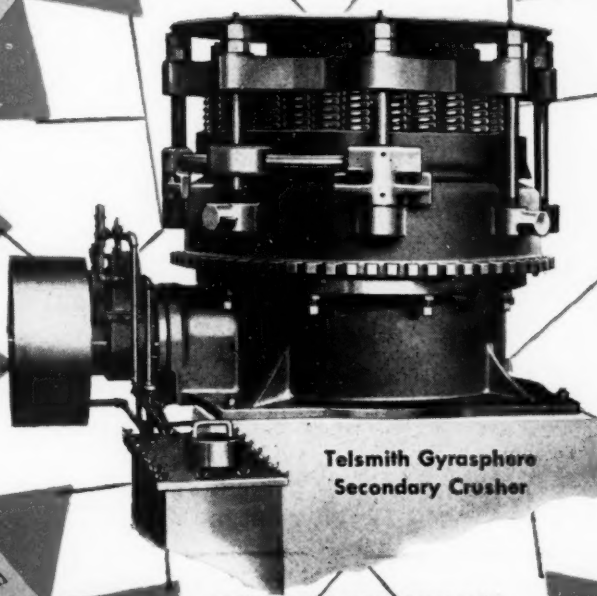
The Helena, Montana, City Council has granted a lease to C. B. Mitchell, manager of the Columbia Mining Company, Inc., to continue its mining of the channel in Last Chance Gulch. Mitchell has assigned the lease to the company, which pays the city a 10 percent royalty. The placer gravel is mined through a shaft and is washed on the surface, and the operation is one of very few in the United States. The company also is engaged in developing a copper deposit, by means of an adit in its Copper Cliff claim, which is adjacent to the placer area being worked (on the right in the picture). Production from the copper vein is scheduled for sometime this year.



Surface and underground development has started at the Come Back mine under lease to Boise Basin Mining Corporation,

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Pioneerville, Idaho, according to Grover C. Thompson, vice president and general manager. The Come Back has been worked intermittently for about 26 years. In the past several years 5,000 feet of development work has been done by lessees seeking high-grade ore only. They produced some gold, silver, lead and zinc. Boise Basin expects to start operating on a full-scale basis soon.

In the first six months of 1951, Clayton Silver Mines, Clayton, Idaho, reports net smelter receipts of \$319,156, compared with \$107,787 for the same period of 1950. Reserves are said to be sufficient to continue running the mill at its present rate for another four years without major development.

Golden Century Industries, Inc., of Salt Lake City, Utah, has completed its preliminary testing of the Wash Creek Placer containing monazite and gold. Under the direction of Engineer George Fenton, test shafts were sunk to bedrock and concentrates recovered from this work carried, besides gold and monazite, some ilmenite, zirconium and garnet. The company has the Yuba Manufacturing Company working on designs for the proper equipment for the property. So far, about 504,000 cubic yards of workable gravel have been proved and about an equal amount is estimated to exist further downstream.

The Lucky Friday Silver-Lead Mines Company has completed cutting the station and pockets on its new 2,000-foot level at Mullan, Idaho. The south cross-cut to the main Lucky Friday vein has been started and will intersect the vein about 400 feet along, according to John Sekulic, president. Production is being stepped up slightly.

Under construction is a 400 hp. hoist to be used at Atlas Mining Company's property near Mullan, Idaho, when the \$1,000,000 exploration project gets to the shaft-sinking stage. The hydraulically braked, tandem-drummed hoist will be completed about January, 1952.

Another access road project certified by DMA's Bureau of Public Roads is under way in Idaho where one road is being built to an operating cobalt-copper mine in Lemhi County and another is planned to an operating fluorspar mine in the county.

Edmund G. Wilson, president of Idaho Consolidated Mines, Inc., reports that the development adit at the Twin Peaks mine, 17 miles south of Salmon, Idaho, and 1.5 miles west of the Salmon River, has been advanced to the 1500-foot point, and that copper orebodies intersected in the last 300 feet show great promise. The adit was driven to intersect chalcopryrite-bornite and galena structures exposed on the surface and predicted at depth near the 1200-foot point in the new adit. The showings in the adit have recently been inspected by outside groups of interested technical men.

Ore discoveries have been announced by several Idaho companies. Sun Valley Lead-Silver Mines operating near Ketchum at the Blue Kitten mine is stockpiling ore from a vein which has been followed 30 feet and widened from a few inches to 12 feet. A lower adit has been started to gain additional 100 foot of depth on the ore. Idaho Goldfields, Inc., while surface-bulldozing from an earlier discovery on its Reserve Creek property, found an eight-foot structure which showed three feet of oxidized material partly lead-carbonate, and five feet of quartz. One grab sample was reported to assay 24.10 ounces in gold, 48.9 ounces of silver and 38.6 percent lead.



The **Bradley Mining Company** near Stibnite, Idaho, has begun processing glacial till from the mouth of the Yellow Pine pit. The company is recovering scheelite, using a gravity plant comprised of grizzlies, trommels, jigs and tables. Although the plant has been operating since late June at a rate of about 2,000 bank tons per day, results to date are inconclusive. However, if this operation ultimately duplicates the laboratory work, then rate may be increased to 5,000 tons per day. But the plant will only be operating during the six to seven "open" months of the year.

The Idaho group of eight-claims has been acquired from the **Proctor-Knott Company** of Seattle by **Sunset Minerals, Inc.** The group consists of six patented claims and two fractions and lies between Sunset's east boundary and **Sidney Mining Company's** west boundary, according to **Bliss Moore**, general manager of Sunset. The property is developed by several adits and open cuts. Sunset plans to construct a new road from its No. 2 tunnel to the Idaho No. 2 tunnel and will take out a small tonnage of lead-zinc ore available in the latter. Development plans are in the preliminary stages of discussion.



**Golden Anchor Mining and Milling Company** reports progress in reopening the **Big Dick** (or **Evening Star**) and the **Black Jack** mines in the Treasure Mountain mining district near Elliston, Montana. Six men are employed, according to **Henry L. Newmiller** of Spokane, president. A projected 300-foot working tunnel has been driven more than 80 feet. It cut a vein  $5\frac{1}{2}$  feet wide near the portal. The tunnel will intersect two more known veins, drain old workings and eliminate hoisting of the ore. A new air compressor was installed recently and a mucking machine ordered. The company is selling two old dumps estimated to contain about 12,000 tons of low-grade milling ore.

**Nancy Lee Mines, Inc.**, at last report from company officials, had opened 300 feet of ore in its new lower adit at its property in the East Coeur d'Alene mining district of Mineral county, Montana. The "face" reportedly showed good silver-lead-copper ore over a width of 7 feet. One raise had been holed through to the upper tunnel 170 feet above, a second was nearing completion and three more had been started in ore. Regular shipments of mill concentrates were being trucked to the East Helena smelter. Crews were clearing a right-of-way for a four-mile power line from the mill to the mine, now Diesel-powered.

**Kimball Mines, Inc.**, of Spokane, Washington, has found "rich milling grade" ore in its new creek-level adit at the **Kirstead** property in the Treasure mountain mining district, Powell county, Montana, according to **Sarah L. Stratton**, president. The mine contains lead, silver, gold, zinc and copper. Ore in the new adit, which gains 100 feet of depth, is considerably richer than in the 1200-foot upper tunnel. The downward extension of the orebody was intersected 111 feet from the portal and 83 feet of drifting on

the structure has been in ore. This work reportedly has partially blocked out 8,000 tons of mill feed. **Denver Equipment Company** is preparing a flow sheet for a small concentrating plant which the company plans to install when sufficient additional ore is developed by continuing the drift and driving raises to the upper tunnel at 100-foot intervals. The improved ore showing is said to be at the lowest elevation in the district. Previous production reportedly came from workings high on the sides of the mountains.



**GOP Antimony, Incorporated**, recently started producing antimony concentrates at Omak, Washington. Ore is being taken from several old Okanogan county antimony mines held under lease. They are the **Lucky Knock**, north of Tonasket; the **Bales**, near Carlton; and the **Queen**, between Carlton and Methow. The ore is milled in the old American Graphite and Metals Company mill near Omak. Shipments reportedly have been contracted to **Hummell Chemical Company** in New York and **Baltimore, Md.**, paint producers. The GOP firm was organized by **Joseph Gray**, **Ernest Oberbillig** and **Gilbert Pearson**. **Oberbillig** is the son of **J. J. Oberbillig**, owner of the antimony property at Stibnite, Idaho, being operated under lease by **Bradley Mining Company** of San Francisco.

The old **Torrell** lead-zinc prospect northwest of Ione, Washington, is being diamond-drilled under the supervision of **H. C. O'Brien**, real estate dealer, of Newport, Washington. The work is being done by **C. C. Cannon** of Chewelah, who recently organized a diamond drilling firm.

**William Anderson** of San Mateo, California, has bought the **Amazon**, **Amazon Extension** and **Wild Goose** patented claims on Eagle Mountain near Chewelah, Stevens County, Washington. This area has been pretty inactive for many years, the principal activity being further north near Colville, but copper, silver, lead and gold have been found in small amounts throughout the Chewelah area.

The Government certificates of necessity received by the **Reynolds Metals Company** and the **Kaiser Aluminum and Chemical Corporation** for expansion projects in Washington will enable each company to turn out 40,000,000 pounds more of aluminum yearly. Reynolds will enlarge and improve its present facilities at Longview which now have a capacity of 60,000,000 pounds annually. Kaiser will add an eighth potline at its Mead plant to increase capacity. The seven potlines now existing produce about 280,000,000 pounds annually. The companies expect to be turning out the additional quota by the end of the year.

**Gold Bond Mining Company** has completed a 2000-foot aerial tramway in the **Blewett** mining district southwest of Wenatchee, Washington, and placed its enlarged "lower" mill in operation. Two buckets each will carry about 800 pounds of ore every trip. President **Frank Lilly** of Spokane reported finding under the tram a one-pound piece of float assaying \$79,932 a ton in gold! A search for the source is underway.

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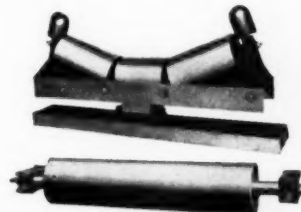
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## precipitates—SOUTHWEST

### DMA Loans Granted to Southwestern Firms

The Defense Minerals Administration has listed further recipients of its grants for its exploration and development of strategic minerals in the southwestern states and some of the companies are listed below:

In California: Howard L. Miller and Louis Warnken, Jr., have been granted \$45,000, 75 percent of planned expenditures for tungsten development in Inyo County; G. McGuire Pierce of U.S. Tungsten Mines has received \$11,250 (75 percent) for tungsten development in Fresno County; the Petroleum Investment Trust, Ltd., has received \$10,527 (75 percent) for work at a tungsten showing in Kern County; the Philip Carey Manufacturing Company has received \$71,550 for asbestos exploration in Trinity County; the Cordero Mining Company received \$75,000 for diamond drilling at the Almaden quicksilver mine in Santa Clara County; the Altoona Quicksilver Mining Company received \$67,839 for mercury exploration in Trinity County; and the Black Rock Mining Company received a grant to assist in its extensive tungsten development and mining operations in Mono County.

In Nevada, David G. Wood will develop a tungsten prospect in Douglas County; Bristol Silver Mines Company, Inc., will spend \$180,000 in DMA funds for 8,000 feet of drifting and raising at the Bristol lead-zinc-copper mine near Pioche, Lincoln County; and J. A. Madison also will develop a tungsten prospect in Mineral County.

In New Mexico, the Peru Mining Company has been granted \$112,500, 50 percent of proposed expenditures for further work at its lead-zinc properties in Grant County.

In Texas, the National Lead Company plans additional work at its Fort Bend County sulphur property. (For Arizona DMA grants, see Arizona section below.)

### DPA Grants Certificates Of Necessity to SW Firms

Certificates of necessity for accelerated tax amortization for expanded defense facilities have been granted by the Defense Production Administration recently to various southwestern mining companies.

The American Zinc Company of Illinois applied for a rapid write-off on \$407,026 to be used to build a precipitating unit to recover zinc and cadmium-bearing flue dust at Dumas, Texas. The entire amount was eligible with a 60 percent certification.

The American Smelting & Refining Company made five applications to the government recently, all of which were eligible and all of which were 60 percent certified. These applications were for write-offs for \$67,000, \$745,000 and \$5,854,000 for electrolytic facilities and other equipment to refine zinc at Corpus Christi, Texas; \$58,500 for a zinc retort at

Amarillo, Texas; and \$110,000 for additional facilities for the production of lead bullion and copper and bismuth at Selby, California.

The United States Vanadium Company was eligible for \$460,000 of \$533,200 applied for with 85 percent certified for increased facilities for production of synthetic scheelite at its Bishop, Inyo County, California, plant.

### Nevada Company Formed To Mine Base Metals

The American Mining and Oil Corporation is being formed to develop and produce strategic metals in Nevada. Organizers are W. J. Loring and J. V. Grismer, mining men of Tonopah, and J. G. Young, geophysical engineer of Seattle, Washington.

According to Loring the first project will be the development of the Copper Queen property of five claims and the nearby Sally Louise of six claims at Lone Mountain, Esmeralda County, under lease and option from Peter Fabbi of Tonopah.

Under the direction of Grismer, the 150-foot shaft at the mine is being equipped with a larger hoist, and sinking to the 200-foot level will soon be undertaken. Continued driving of a crosscut on the 150-foot level will be done; sixteen feet of driving already finished crossed an excellent vein carrying copper, lead, and zinc ore.

The company expects to explore for oil prospects later on.

### Lignite-Powered Smelter Planned by ALCOA

A new aluminum smelting plant, the first known to use lignite for fuel, will be built by the Aluminum Company of America in the immediate future at one of several alternate locations about 60 miles south of Waco, Texas.

The company has applied to the DMA for a certificate of necessity to begin construction of the plant, which will have a production capacity of 85,000 tons of aluminum yearly when completed in the fall of 1952. About 1,000 persons will be employed.

In the Milam County, Texas, area large deposits of lignite exist which will be mined by stripping and slope mining methods and transported to a power plant, to be built. The large amount of electricity necessary for aluminum production will be generated by steam-driven equipment using the processed lignite as fuel.



The Climax Uranium Company has started uranium-vanadium mining at its

large group of claims in the Lukachukai Mountains of northeastern Arizona. Joe Weston, Grand Junction, Colorado, is superintendent of Climax's uranium mines and is directing the work. Extensive road building and constructing of a mine camp preceded the opening of the mines.

The Defense Production Administration has granted a certificate of accelerated amortization to Phelps Dodge Corporation for a portion of its investment in developing the new openpit mine at Bisbee, Arizona. It is understood that the rapid tax write-off will apply to \$9,301,000, or 75 percent of an investment of \$12,401,000. The total cost of developing the mine has been estimated at over \$28,750,000.

MacFarland and Hullinger of Salt Lake City, Utah, have leased a group of lithium claims five miles southeast of Vulture Peak, near Wickenburg, Arizona, and propose to test the property by diamond drilling. Bert Boyd is foreman, employing four men in the preliminary work.

Joseph B. Rice, Jr., 2696 Santa Rosa Avenue, Altadena, California, and associates are reactivating the Williams tungsten mine, located near Kingman, Arizona.

Stoping and drifting operations have been started on the 600-foot level of the Cash mine in the Hassayampa mining district, near Prescott, Arizona, and shipments of gold, silver, copper, lead and zinc ore are expected shortly. The property is owned by E. R. Dickie of Bagdad and Jack Orr, Route 1, Box 390, Iron Springs Road, Prescott. The latter is in charge of the work, employing a crew of six men. Past shipments from the Cash have been sent to the Iron King mill.

The J. L. Mining Company, Humboldt, Arizona, is sinking an exploration shaft at the Silver Queen mine and has reached a depth of 200 feet where a station is being cut. W. S. Ballard is president and manager, employing a crew of seven men.

Bush and Merrill, operators of the Fairview mine near Klondyke, Arizona, have attained a vertical depth of 200 feet in their shaft sinking. A new hoist has been installed and new hoist house erected. It is reported that the vein has widened to 14 feet at the 200 level; values are in lead, zinc, silver and gold.

Harris, Shockley and Boone of Klondyke, Arizona, have started work on the prospect they are leasing from Pete Bailey of Superior. They have taken in a C-P portable compressor and are erecting a loading platform.

The Upshot Mines, Inc., Mayer, Arizona, is diamond drilling on the 300-foot level to explore the walls. A crew of five men is employed under the direction of Anthony Sullivan. Omar D. Smith, Valley National Bank Building, Prescott, is president of the company.

The Bulldozer group of claims, near Sahuarita, Arizona, has been leased by P. J. Rainey, 834 West Thomas Road, Phoenix, Arizona. He has installed a motor hoist, has sunk a 60-foot shaft, and is drifting on a copper vein. He plans to sink the shaft to the 100-foot level soon.



Repair work has been started at the *Doughboy* shaft of the *Comstock Extension Mining Company*, Globe, Arizona, under the direction of Tony Trojanovich, mine superintendent. Henry W. Nichols, mining engineer, Box 98, Oracle, has been employed as consultant to direct the new development program. Company officials recently elected are: John H. Evans, president, 401 Heard Building, Phoenix; Joseph C. Cubitto, vice president, Miami; and Blanton T. Dick, secretary-treasurer, Tempe. A crew of seven veteran miners is employed in the initial work.

The *Bonanza Mining Company* is shipping two carloads of copper-gold ore to the smelters at Superior and Hayden a week, and hopes soon to be on a car-per-day basis. The main shaft is down to the 600 level and plans call for deepening the shaft to the 1,000 level. From 12 to 16 men are employed regularly cross-cutting and drifting on the lower mine levels. Roy R. McDonald, Wenden, Arizona, is president and general manager.



As of August 16th, 1951, the *New Idria Mining and Chemical Company* had not, contrary to numerous reports, reopened its quicksilver property near Hollister, California, according to a statement by Gordon I. Gould, president. The company does have about 40 men, managed

by C. Hyde Lewis, superintendent, on the property repairing the damages in the mine caused by several years' idleness and preparing for immediate operation if mercury prices become definitely stabilized. Incidentally, the above name for the company is a new one, changed recently from *New Idria Quicksilver Mining Company*. The main office of New Idria is at 58 Sutter Street, San Francisco.

In the Big Bear Lake region of San Bernardino County, California, a discovery of uranium has been made. The actual location is in Van Duzen Canyon, seven miles from the town of Big Bear Lake, on the old Scotty Wilson property formerly mined for lead and silver. Philip J. Barnes, lessee of the claims, has supervised the work leading to the discovery of uranium, and at present a crew is sinking a shaft to do further exploration. A Los Angeles engineer, Frank R. Wicks, is consultant for the development of the property and Leonard G. Blake-more is resident engineer. So far the occurrence of uranium has been found in one place only on the surface—not enough to make definite plans for production.

Roy Wilbur and his partner Bob Gwyn are developing a scheelite mine in Dead Horse Meadows, White Mountains, Inyo County, California. The blanket vein, varying in thickness from 12 inches to several feet is overlain by shallow overburden which is bulldozed away. The men have built a mile and a half road to the property. So far one ton of ore has been milled (in a small gold concentrator operated by Lyle Donahue) as a test and 134 pounds of tungsten con-

centrate was recovered, according to reports.

*Tungsten Allied Minerals Company* will handle tungsten ore in a reconditioned rock crushing plant at 12234 Los Nietos Road, in the Santa Fe Springs oil field district of California, according to reports. The mill, of 25 tons capacity, will be expanded to 35 or 40 tons capacity. E. W. Thompson and W. H. Pinchback, Jr., are partners in Tungsten Allied Minerals.

The *Black Rock Mining Corporation* is well along in its project to expand tungsten operations in the Bishop area, California. Equipment has been hauled 34 miles from Bishop to the *Black Rock* mine, roads leading to company properties have been improved, and the mill from Nevada's *Northumberland* gold mine will be installed in several weeks. The mill's present capacity is 750 tons of ore daily; it will be revamped to treat tungsten. At present *Black Rock* is shipping 300 tons of scheelite ore daily to U. S. Vanadium's mill near Bishop.

In the lower levels of the *Cargo Muchacho* gold mine, scheelite has been discovered associated with the gold in the veins, and the *Homestake Mining Company*, operator, will convert its mill to concentrate tungsten. The mill, burned in 1946, was rebuilt in 1950 and has a capacity of 100-tons daily. The *Cargo Muchacho* is near Ogilby, Imperial County, California.

The *Iron Age Mine*, 31 miles east of Twentynine Palms, California, having made a token shipment of 2,000 tons of iron ore, has ceased mining temporarily in order to carry on some magnetometer tests. These tests were said to require 30

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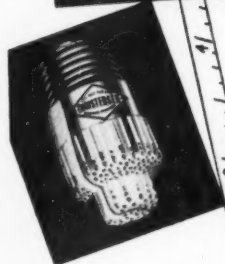
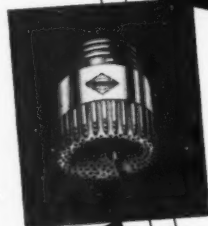
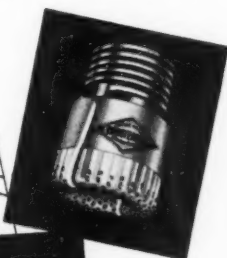
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days and were to be followed by core drilling tests requiring a further 30 to 60 days. When mining is resumed a stockpile of about 30,000 tons will be built up before shipments begin again. The Ferro Corporation of Los Angeles is owner of the Iron Age, and George H. McDonald is president of Ferro.

Yolo Steel & Metal Company is reportedly diamond drilling an iron-bearing area in Plumas County. The company also holds iron properties in Shasta County in the McCloud River region, in Lassen County and in Plumas County in the Moonlight region, and in Mendocino County near Fort Bragg, where investigations for coal are planned. Results of drilling up to now are unknown. G. L. Dumond of Sacramento, a mining engineer, is president of Yolo.

Harry L. Moore and E. R. Holmes are developing 14 copper-lead-zinc-bearing claims on Price Creek near Big Bar, Trinity County, California. According to Moore who lives at Big Bar, veins striking northwesterly have been traced from Price Creek to the summit of the nearby Galena Ridge.

NEVADA

Persistent rumors of a major tungsten ore discovery northeasterly from Mountain City, Nevada, have been coming from Elko, which is the gateway for that area. Although reports vary, Knowles Bros. trucking company, using heavy equipment, is exploring a large contact of granite and limestone containing epidote-garnet and varying amounts of scheelite ore. The structure is about 20 miles northeasterly from Mountain City and has an east-west strike extending several miles in length; width is unknown. Jack Mink, who has prospected the area for many years, has located a group of claims east of the Knowles operation and is developing his discovery using a dozer to remove the overburden. Indications and reports reaching Elko are giving rise to the possibility that this contact may be the largest discovery of tungsten-bearing rock so far found in Nevada.

Preparations to mine 1,000 tons of iron ore daily from its properties in the Lovelock, Nevada, area have been started by the Mineral Materials Company of Alhambra, California. The company acquired 16 claims about 10 years ago and diamond drilling during the last war indicated the existence of from 2,000,000 to 4,000,000 tons of magnetite-bearing ore. Since then considerable exploration and development has been done by the company. Equipment for stripping and open-pit mining is now arriving at the property. Ramps and a new siding are being constructed beside the railroad, five miles from Lovelock. Mineral Materials operates, among other properties, the Star-bright tungsten mine near Barstow, California. Clair W. Dunton of Alhambra is company manager; Thomas J. Thorne is field engineer in Nevada.

Don Burgner of Reno, operator of the Black Horse tungsten mine near Coaldale,

(Continued on Page 68)

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## METAL AND MINERAL MARKETS

### METALS

August 20

COPPER:	Electrolytic. Delivered F.o.b. cars, destination U.S.A.....	24.50¢
	Lake. Delivered, destinations U.S.A.....	24.625¢
	Foreign Copper. New York.....	27.50¢
LEAD:	Common Grade. New York.....	17.00¢
ZINC:	Prime Western. East St. Louis.....	17.50¢
ALUMINUM:	Primary 30 pound Ingots (99% plus). F.o.b. shipping points.....	19.00¢
ANTIMONY:	Bradley Mining Co.'s Elk Brand 99.5%. F.o.b. Cascade, Idaho.....	50.00¢
	Lone Star Brand. F.o.b. Laredo, in bulk.....	42.50¢
COBALT:	97-99%, keg of 550 pounds.....	\$2.10
MAGNESIUM:	Ingots (99.8%). F.o.b. Freeport, Texas.....	24.50¢
MERCURY:	Flasks. Large lots, New York.....	\$195.00
NICKEL:	"F" Ingots (5 pounds). F.o.b. refinery, Port Colborne, Ontario.....	56.50¢
TIN:	Grade A Brands. New York.....	103.00¢
TITANIUM:	(98.5%). F.o.b. Beverly, Massachusetts.....	\$7.00
GOLD:	United States Treasury price.....	\$35.00 per ounce
SILVER:	Newly mined domestic. United States Treasury price.....	90½¢ per ounce
	Foreign. Handy & Harman.....	90.16¢ per ounce
PLATINUM:	.....	\$90.00-\$93.00 per ounce

### ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO. F.o.b. mine, Colorado.....	\$35.00 per unit
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr <sub>2</sub> O <sub>3</sub> . 3 to 1 chrome-iron ratio.....	\$42.00-\$43.00
	African (Transvaal). 48% Cr <sub>2</sub> O <sub>3</sub> .....	\$34.00-\$35.00
IRON ORE:	Turkish. 48% Cr <sub>2</sub> O <sub>3</sub> . 3 to 1 chrome-iron ratio.....	\$50.00-\$51.00
	Lake Superior. Per gross ton Lower Lake Ports.....	
	Mesabi, Non Bessemer, 51.5% Fe.....	\$8.30
	Mesabi, Bessemer, 51.5% Fe.....	\$8.45
	Old Range, Non Bessemer.....	\$8.55
MANGANESE ORE:	Old Range, Bessemer.....	\$8.70
	Metallurgical grade. 45 to 46% Mn. Long ton unit.....	\$1.05 to \$1.15
	Chemical grade. 80% MnO <sub>2</sub> . Per ton.....	\$60.00
MOLYBDENUM CONCENTRATE:	Chemical grade, domestic, 70% MnO <sub>2</sub> , F.o.b. mines.....	\$45.00
	90% MoS <sub>2</sub> . F.o.b. Climax, Colorado. Per pound of contained molybdenum.....	\$1.00
TUNGSTEN CONCENTRATE:	60% WO <sub>3</sub> . Per short ton unit.....	\$65.00
URANIUM ORE:	Carnotite-Roscoelite. F.o.b. purchase depot plus \$0.06 per ton mile (maximum of \$6.00), Rifle, Naturita, Uravan and Durango, Colorado; Salt Lake City and Monticello, Utah. Base price for 0.10% ore is \$1.50 per pound and ranges to \$3.50 per pound of contained U <sub>3</sub> O <sub>8</sub> plus \$0.75 per pound for each pound in excess of four pounds per short dry ton and an extra allowance of \$0.25 per pound for each pound in excess of 10 pounds. A development allowance of \$0.50 per pound is paid for all ores purchased.	
VANADIUM ORE:	Carnotite-Roscoelite. V <sub>2</sub> O <sub>5</sub> content, up to 10 pounds, in uranium ore paid for at \$0.31 per pound in ratio of 10 parts V <sub>2</sub> O <sub>5</sub> to 1 part U <sub>3</sub> O <sub>8</sub> .	

### NON-METALLIC MINERALS

BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots.....	\$12.50
	Oil Well grade. Packed in 100 pound paper bags.....	\$14.00
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	Illinois-Kentucky mines.....	\$43.00
	Ceramic grade. Minimum CaF <sub>2</sub> content, 95%.....	\$45.00
	Acid grade. 97% CaF <sub>2</sub> .....	\$50.00
PERLITE:	Crude: F.o.b. mine per short ton.....	\$3.00 to \$5.00
	Plaster grades. Crushed and sized. F.o.b. plants per short ton.....	\$7.00 to \$9.00
	Concrete grades. Crushed and sized.....	\$6.00 to \$8.00

Quotations on metals and certain ores through the courtesy of American Metal Market, New York, N.Y.

SEPTEMBER, 1951

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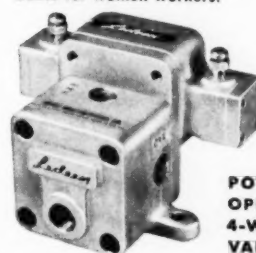
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Continued from Page 83

has leased another scheelite property seven miles north of Tonopah, Nevada, in association with Dennis Hill of the Hill Equipment Company of Reno. So far about 4,500 tons of overburden have been stripped from the orebody to prepare for systematic sampling and prospecting. The orebody is thought to extend at least 1,000 feet and to be about 35 feet wide.

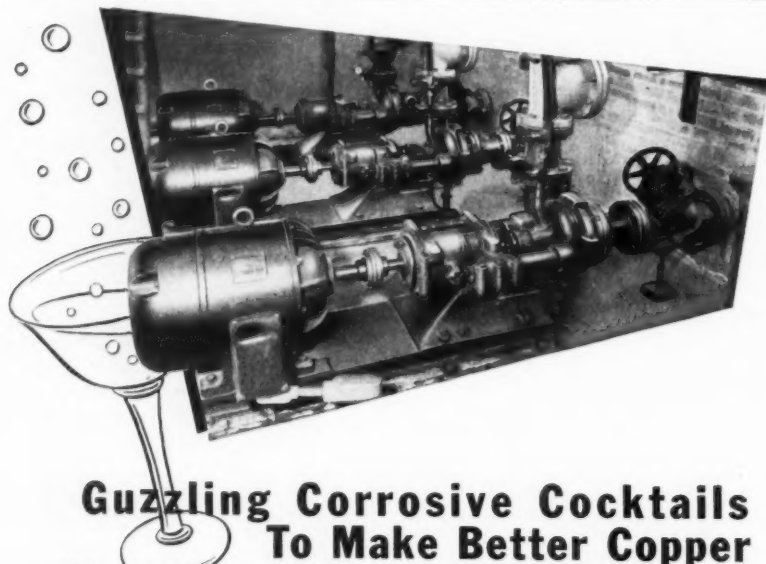
Lee Duggan of Salt Lake City, Utah, has completed equipping his 100-ton Victory tungsten mill near the Gabbs, Ne-

vada, airport. His first shipment of concentrate from the Victory mine, 10 miles north of Gabbs, has been sent to market. At another nearby tungsten property, the Nevada Pacific Development Company has moved in equipment and started development work.

Rumored as possible buyers of parts of the Basic Magnesium Plant at Henderson, Nevada, are the Combined Metals Reduction Company and the National Lead Company, both of which now lease space at the Plant. Combined Metals is said to have a purchase option, and this may be taken up soon. Another unnamed metal

company also is seeking to buy some of the space.

Associates of the late James O. Greenan are re-opening and equipping an old lead-silver mine north of Gabbs, Nevada, preparatory for underground mining.



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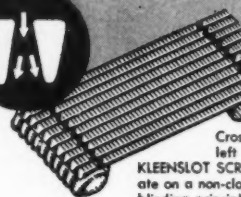


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Plans have been made to ship dump ore while rehabilitation of the mine is under way. Meantime, Greenan Placers, operated by the Natomas Company under lease, reportedly is resuming gold dredging in the Copper Canyon district near Battle Mountain, using one dredge.

## NEW MEXICO

The new Petaca Minerals Corporation of New Mexico, which has acquired mica-bearing lands near the town of Petaca in northern Rio Arriba County, has applied for about \$500,000 from the Defense Minerals Administration for development and mining purposes. The company was hoping to begin building a plant near Petaca by mid-August with the De Anza Engineering Company of San Francisco supplying mill and mine equipment. According to Joseph Thompson of Santa Fe, president, and Ross Martinez of Petaca, vice president, the mines would employ about 100 persons and be a peacetime operation as well as a wartime one. The Petaca deposit is said to be a major mica source in the U. S. The company expects to produce by-products including beryllium oxide, monazite, samarskite, columbium-tantalum, ilmenite and bismuthinite.

The General Services Administration during July was setting up a manganese purchasing depot at Deming, New Mexico. The depot is one of three in the country. Otto G. Klein, GSA's regional director, said miners who want to sell manganese at the Deming depot should so notify the GSA regional office in Denver by midnight of September 15th. The miner would receive a certificate authorizing him to bring ore to the depot; there the ore would be assayed and weighed at once, and payment made.

Activity continues in New Mexico's potash field. By July's end the following reports were heard: The sinking of the International Minerals and Chemical Cor-

poration's No. 3 shaft was completed, and work was under way on the loading pockets and dumping arrangements. The firm's No. 4 shaft was down 60 feet. The Duval Sulphur and Potash Company, aiming at beginning production in January, had sunk the No. 1 shaft 992 feet and the No. 2 shaft 896 feet. A drift connecting the two shafts at a depth of 872 feet was completed, and the excavation of a pump station and sump at the No. 2 shaft end of the drift was in progress. The Potash Company of America's south shaft was down 325 feet. The Southwest Potash Corporation's No. 1 shaft was down 286 feet and the No. 2 shaft 228 feet. Work on surface plants was proceeding according to schedule.

The Copper Hill Mining Company shipped a car of hand-sorted ore early in July and waited to see the results. The ore on the site near Grants, New Mexico, had proved to be lower in grade, and contained more silica, than expected originally. The possibility of shipping the ore to the American Smelting and Refining Co.'s smelter at El Paso for flux rather than ore was under consideration.

The defense-boosted New Mexico fluorspar industry remains in high gear. George A. Warner of the Zuni Milling Company said his firm was milling more than 4,000 tons of fluorspar monthly. Blanchard Hanson continues working several fluorspar mines in Sierra County and is now shipping around 1,000 tons a month. A. H. (Dutch) Latham has become associated with him on one mine. Preparations are now being made to increase output of ore to 2,500 tons per month, largely from the Fairview mine near Winston. The fluorspar division of Gloria Mining Company of El Paso (Texas) was operating the reopened Animas mine, 13 miles south of Lordsburg, and was doing development work there under the supervision of C. J. Burnett. The General Chemical Division of the Allied Chemical and Dye Corporation was operating its Deming fluorspar mill at capacity. The firm gets ore from its Shrine mine near Deming and also buys ore on a custom basis; it also is doing development work at its Fluorita mine, also near Deming.

## THE MARKET PLACE

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- 1—2" Kimball-Krogh.

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- 1—64½ Marcy with new Marcy Breast Liners.
- 1—30" x 48" Baker.

#### HOISTS

- 1—#21½ Vulcan Single Drum, direct geared to a U-6 International Gas Power Unit.
- 1—#6 Vulcan, single drum.
- 1—Box I. Wks. Single Drum, direct geared to a 15 HP Slip-ring Motor.
- 1—H&B Single Drum Converted, direct geared to a 25 HP Slip-ring Motor.
- 1—Crow Converted Single Drum Friction direct geared to a 7½ HP Slip-ring Motor.

#### BELT CONVEYORS

- 1—30", 40" centers, Motorized.
- 1—20", 40" centers, Motorized.

#### FLOTATION MACHINES

- 2—No. 24 Denver "Sub-A" with wood tanks, rubber impellers.

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- 1—Bucket Elev. 25' centers 8" x 5½" x 6" Digger Type Buckets, direct geared to 3 HP AC Motor.
- 1—Bucket Elev. 35' centers, 18" x 10" x 10" Digger Type Buckets, complete with steel boot driven by a 5 HP AC Motor.

#### DIESEL GENERATORS

- 1—D-4400 Caterpillar V-belted to a 30 KVA 220 volt Fairbanks-Morse AC Generator, complete with switchboard.

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- 1—10" x 20" Allis-Chalmers Blake.
- 1—8" x 10" Blake.

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- 1—6"x22" Dorr Type Duplex Rake Classifier.
- 1—60"x23" Denver Equipment Simplex Crossflow, Spiral Classifier.
- 1—12" x 12½" Screw Classifier—Motorized.

#### MISCELLANEOUS

- 2—Model "A" Adams Wet Reagent Feeders.
- 1—Jeffrey Vib. Reagent Feeder.
- 1—24" Denver Cone Dry Reagent Feeder.
- 2—Butchart Concentrating Tables.
- 1—5.72 HP New Speed Reducer, 5-1 ratio, 1725-345 RPM.
- 1—12" x 18" Duplex Hartz Jig—Motorized.
- 1—16" x 10" Dorr Thickener Mech., with wood tank.
- 1—6" dia. x 5' Conditioner, steel tank, Motorized.
- 2—20' x 18" Wood Fine Ore Bins.
- 1—Metal Mine Phone.
- 1—R. Motor Mounted Pumps—1 HP to 25 HP.
- Motors—¼ HP to 50 HP.
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## THE MARKET PLACE

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- 1-8"x36" Universal, all steel
- 1-15"x28" Pacific, all steel
- 1-8"x15" Farrell Blake
- 1-8"x36" Cedar Rapids
- 1-13"x24" TelSmith

#### FILTERS

- 1-4' 1-disc Oliver United continuous filter
- 1-4'x6" Morse Bros. continuous drum filter
- 2-8'x12" Eimco continuous drum filter
- 1-36" Merrill triangular leaf filter press
- 1-#12 Sweetland 36 leaf filter press

#### BALL AND ROD MILLS

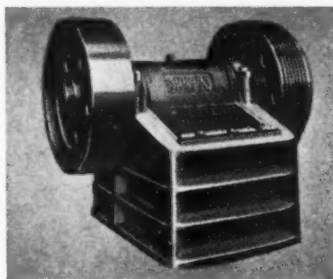
- 4-3'x2' Marcy ball mills
- 1-4'x4' Standard ball mill
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- 2-6'x36" Hardinge conical ball mills
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- 1-64 1/2' Marcy ball mill

#### LOCOMOTIVES

- 1-1 1/2-ton Mancha type b "Little Tram-mer," 24" gauge
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- 2-7-ton General Electric Battery Locomotives, 36" gauge
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#### COMPRESSORS

- 1-5 & 4x4" Ingersoll-Rand 50 CFM vertical
- 1-6x5" Worthington 80 CFM horizontal
- 1-6x6" Gardner-90 CFM vertical
- 1-8 1/2 & 4 1/2x5" Chicago-Pneumatic 139 CFM vertical



- 1-7 & 5 1/2x5" Gardner-Denver 156 CFM vertical
- 1-10 1/2 & 4 1/2x6" Rix 172 CFM vertical
- 1-9x8" Chicago-Pneumatic 173 CFM horizontal
- 1-12x10" Ingersoll-Rand 179 CFM horizontal
- 1-12 & 6 1/2x10" Ingersoll-Rand 293 CFM horizontal
- 1-7 & 5 1/2x5" Gardner-Denver 300 CFM vertical
- 1-9 1/2 & 5 1/2x5 1/2" Chicago-Pneumatic 382 CFM vertical
- 1-14 & 7 1/2x12" Ingersoll-Rand 447 CFM horizontal
- 1-9 1/2 & 6x7" Gardner-Denver 527 CFM vertical
- 1-14x12" Ingersoll-Rand 528 CFM horizontal
- 1-14 & 8 1/2x10" Sullivan 637 CFM angle compound
- 1-16x12" Union 698 CFM horizontal (low pressure)

- 1-18 & 11x16" Ingersoll-Rand 800 CFM horizontal
- 1-13x10" Lardlaw 840 CFM horizontal (low pressure)
- 1-24 & 13x16" Ingersoll-Rand 1418 CFM horizontal

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- 1-105 CFM Schramm driven by Buda gas engine trailer mounted on 4 pneumatic rubber tires.

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- 1-Deister "Plat-O" right hand.
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- 1-Denver equipment conditioner with 5' x 5' tank.
- 2-7' x 7' Morse conditioners.
- 4-8' x 8' Morse conditioners.
- 4-10' x 10' Morse conditioners.

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- 1-7' x 7" Triplex lab. crushing rolls.
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- 1-8 T WEST. 250 V. ML-906-C, 44-36" Ga.
- 2-6 T JEFFREY 250 V. MH-88, 36" Ga.
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1—401 CFM C.P. Straight Line	600
1—220 CFM Ingersoll-Rand	500
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1—25 H.P. 3 drum air Ingersoll-Rand slusher hoist	2,450
2—2 drum Ingersoll-Rand slusher hoists with skips	1,200

#### DRIFTER DRILLS

Ingersoll—C-P—Gardner Denver	\$100 to \$250
Jack Hammers	50 to 75
5—Ingersoll-Rand late model DA 35 automatic feed	395

#### LOG WASHERS

All sizes

#### SPECIALS

1—9 yd. bottom dump heavy steel 4 wheel trailer hydraulic dump (Miss. Wagon) perfect tires 1 year old. List price \$6,250. Our price	\$1,695
For economical rock haulage, Pneumatic rock grip tires like new.	
1—Filter—American 6"—2 leaf with vacuum machine	1,500
Scrapers (for slusher hoists) 42" and 48" NEW with detachable blade, each	100

#### CRUSHERS

24" Jaw crushers—Rogers Blake type	\$1,500
Allis-Chalmers gyratory crushers	\$1,000 to \$1,500

#### TRANSFORMERS—25 and 60 cycle

1—100 KVA 2400 240/480	\$ 500
1—20 KVA 2200 110/220	200
3—75 KVA 2200 110/220, each	400
7—50 KVA 2200 110/220, each	350
2—40 KVA 2200 110/220, each	325
4—25 KVA 2200 110/220, each	225
1—20 KVA 2220 115/230, each	200

#### TRAILERS

1—Heavy duty 2 wheel army surplus trailer	250
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We will de-water mines on contract basis. We will rent equipment of all kinds. Other machinery and equipment for sale too numerous to mention. If we don't have it—We'll find it for you—and at the right price.

ALL PRICES—F.O.B. Joplin, Missouri

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1 105 foot PORTABLE Sullivan Compressor.  
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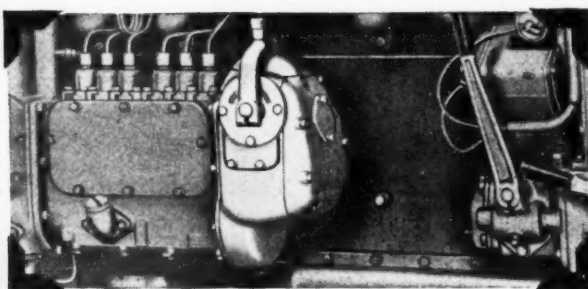
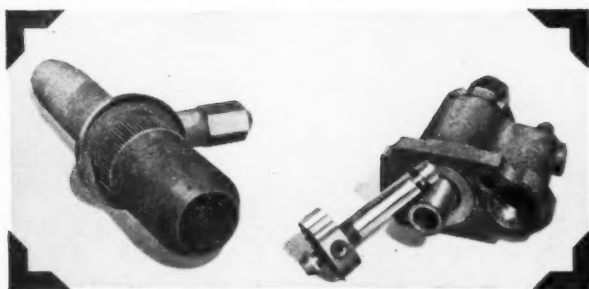
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# STANDARD ENGINEER'S REPORT

## DATA

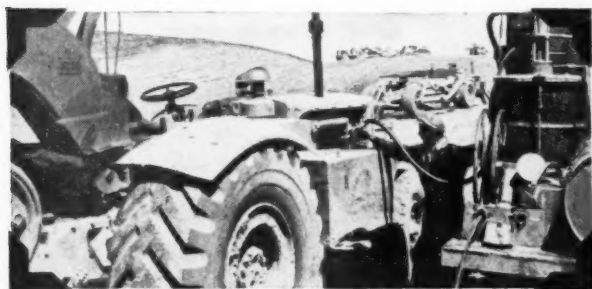
PRODUCT *Standard Diesel Fuel*  
UNITS *High-speed diesel engines*  
CONDITIONS *Heavy duty service—  
overloads, heavy dust*  
PERIOD *10 years*  
FIRM *Parish Bros, Benicia, Calif.*

Specially handled diesel fuel helps increase injector life



BURNING STANDARD DIESEL FUEL in their engines and using special precautions to keep it clean has lengthened considerably the service periods of injector pumps and valves for Parish Brothers, excavating contractors, Benicia, Calif. The unit above

from one of their DW-10 Caterpillars gave the unusual service of 16,000 hours! STANDARD Diesel Fuel helped get this extra service and cut fuel parts expense because it is completely refined, then carefully handled to insure cleanliness from refinery to consumer.



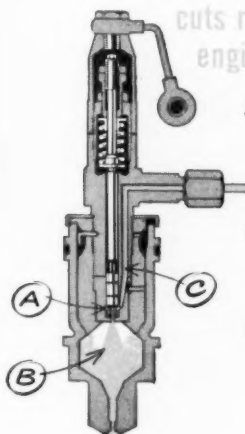
FUELING A HIGH-SPEED TRACTOR on the job with a "wet hose" to avoid getting dirt in the fuel tank.

REMARKS: Standard Diesel Fuel and RPM DELO Oil work together in Parish Brothers diesels to develop high efficiency. They will do the same for you. The fuel is made to exact specifications: the oil contains special compounds which resist oxidation, corrosion, stop foaming and prevent wear. They come in different grades to meet conditions in all sizes and types of diesel engines.



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- C. Has sufficient body to lubricate moving fuel parts, but flows freely even in extremely cold weather.

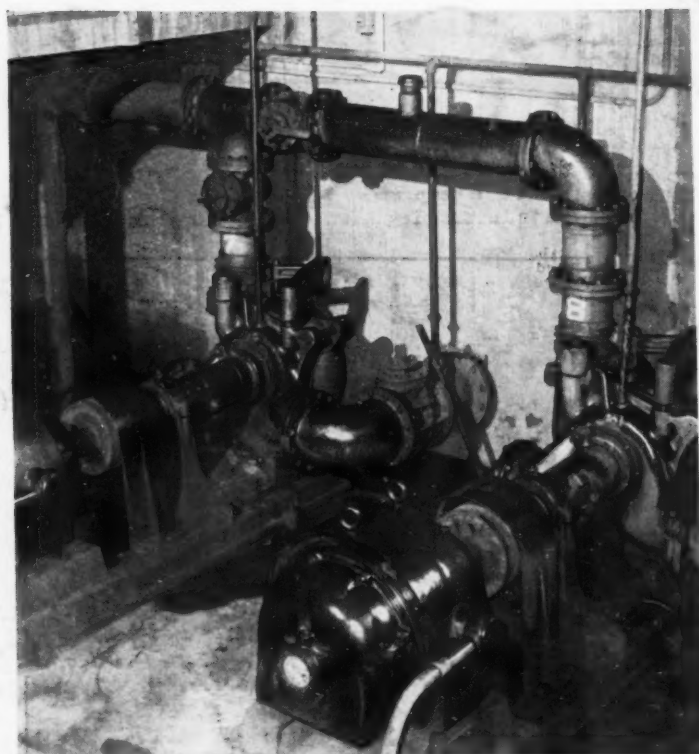
STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA



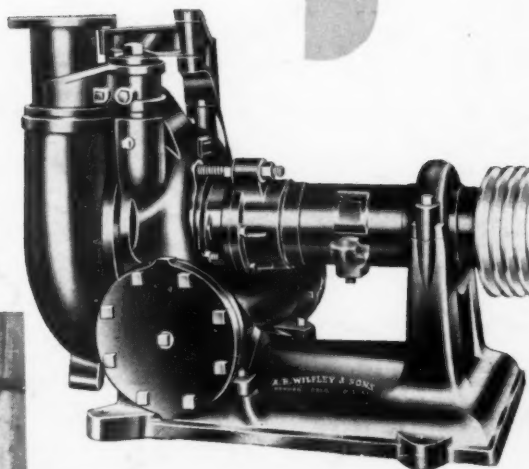
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